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March 1961

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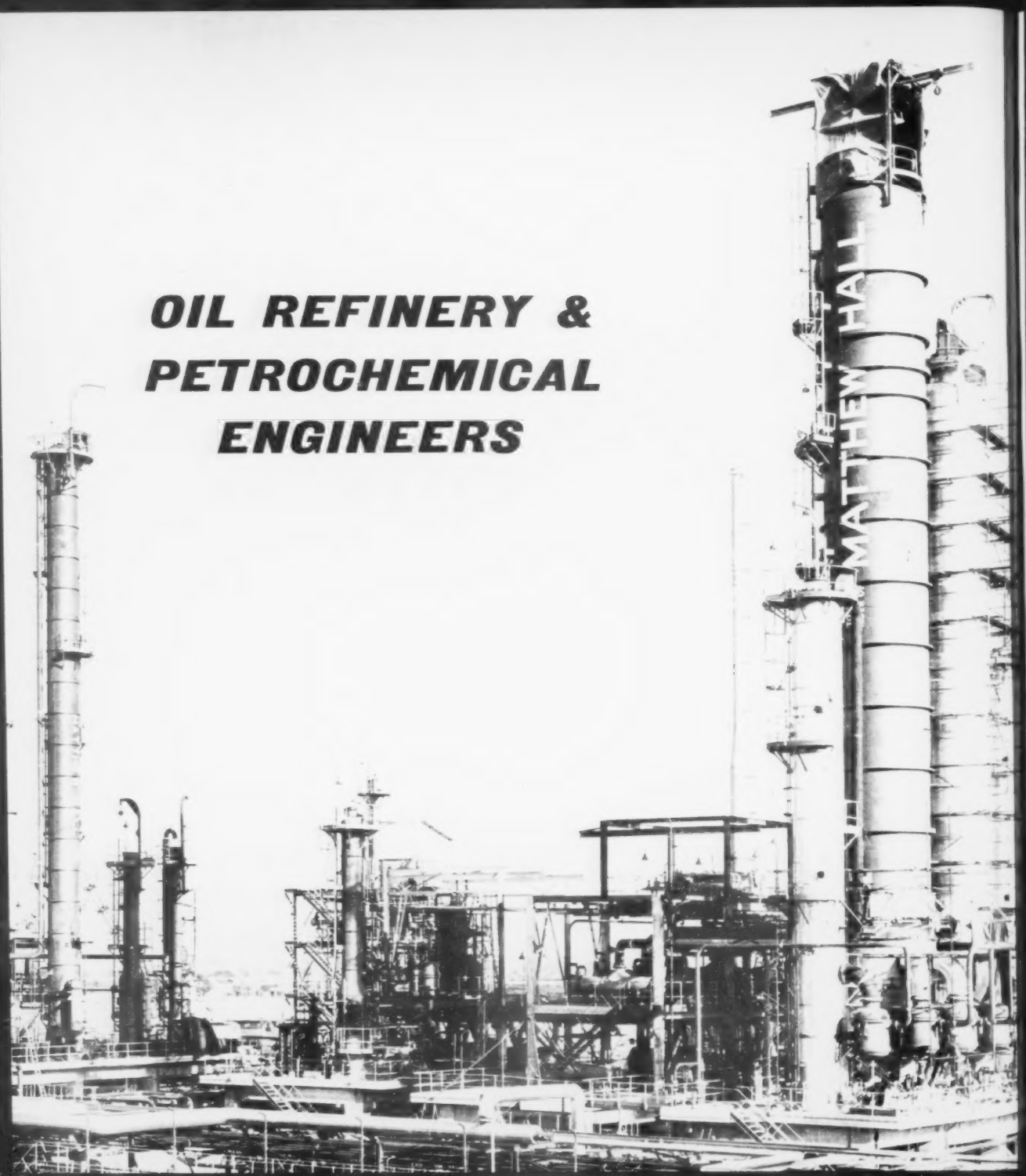

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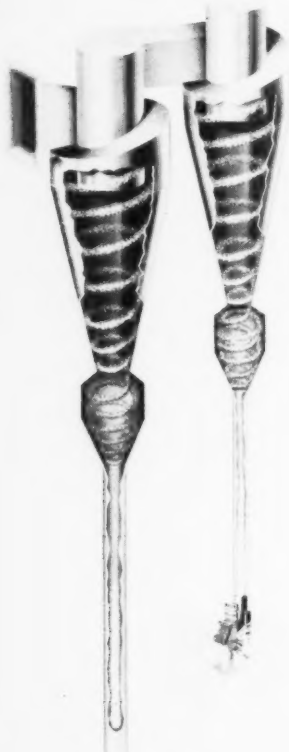

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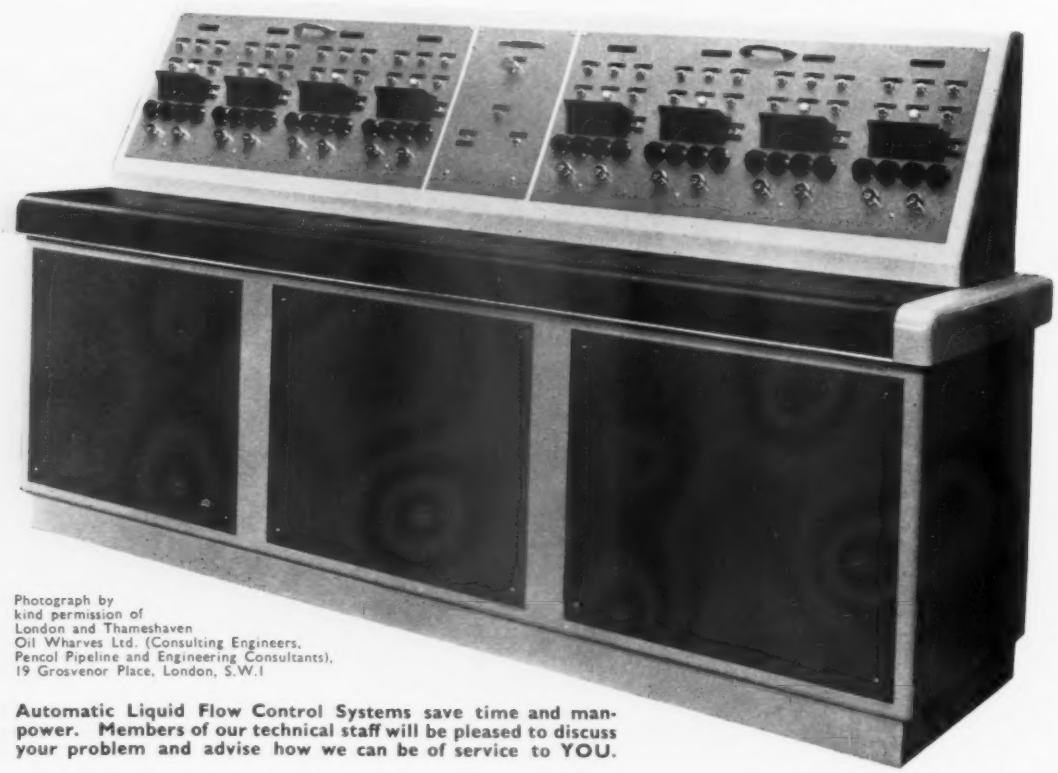

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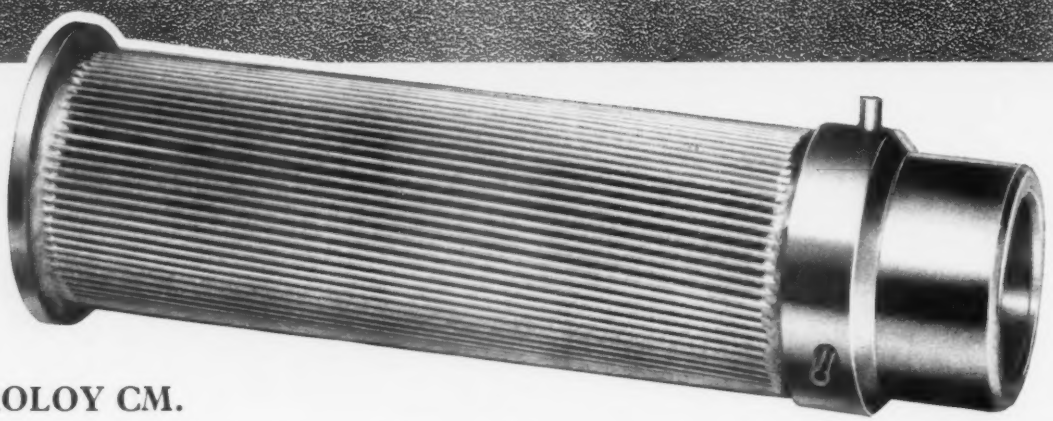

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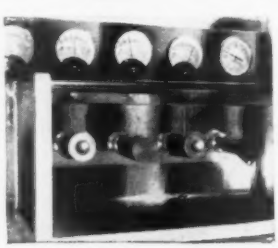

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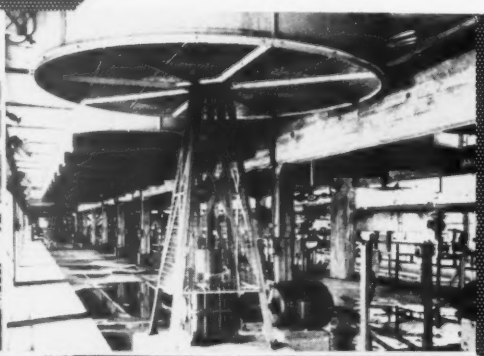

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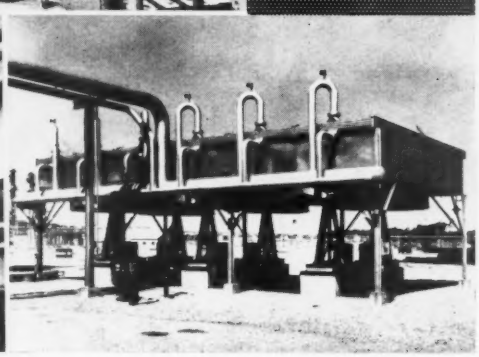

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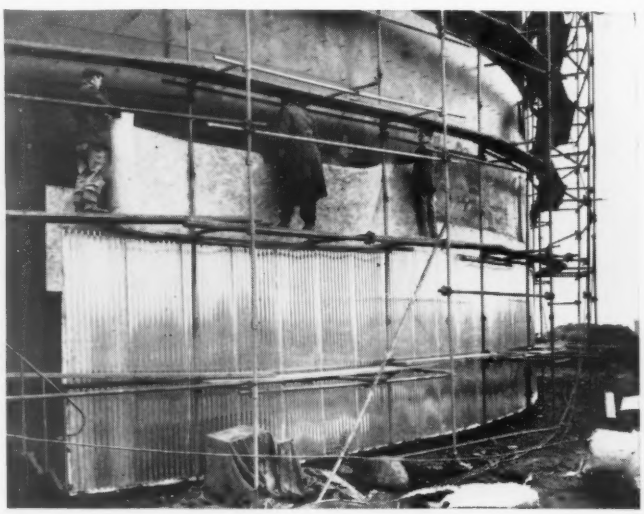

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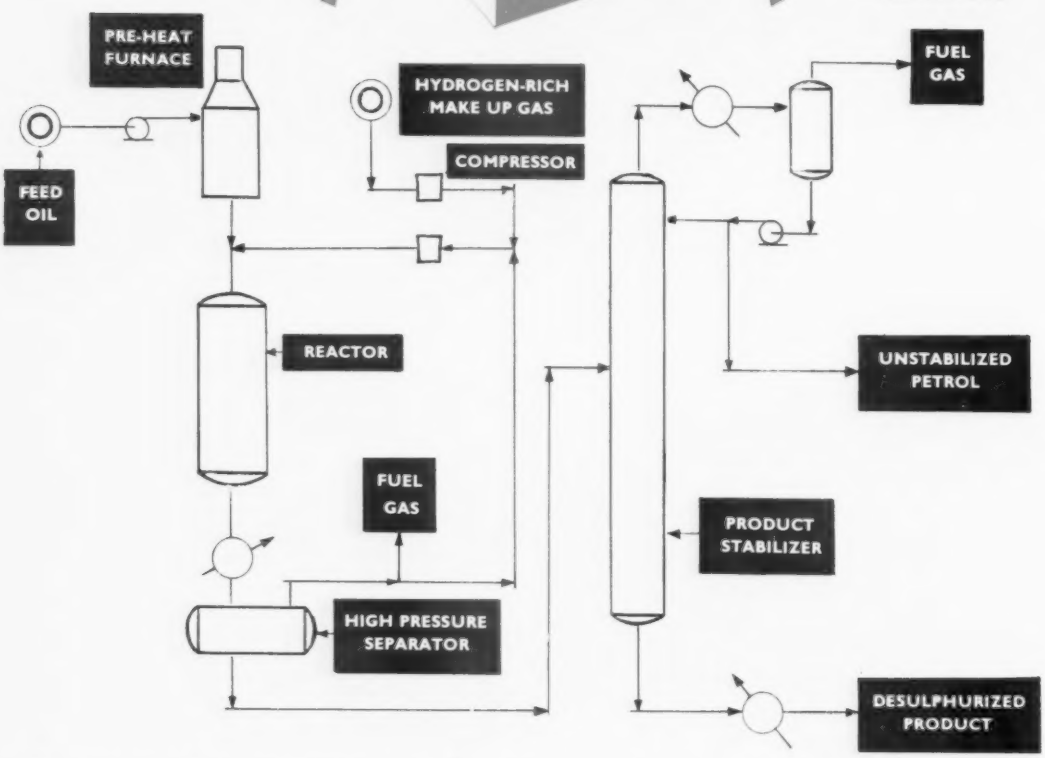

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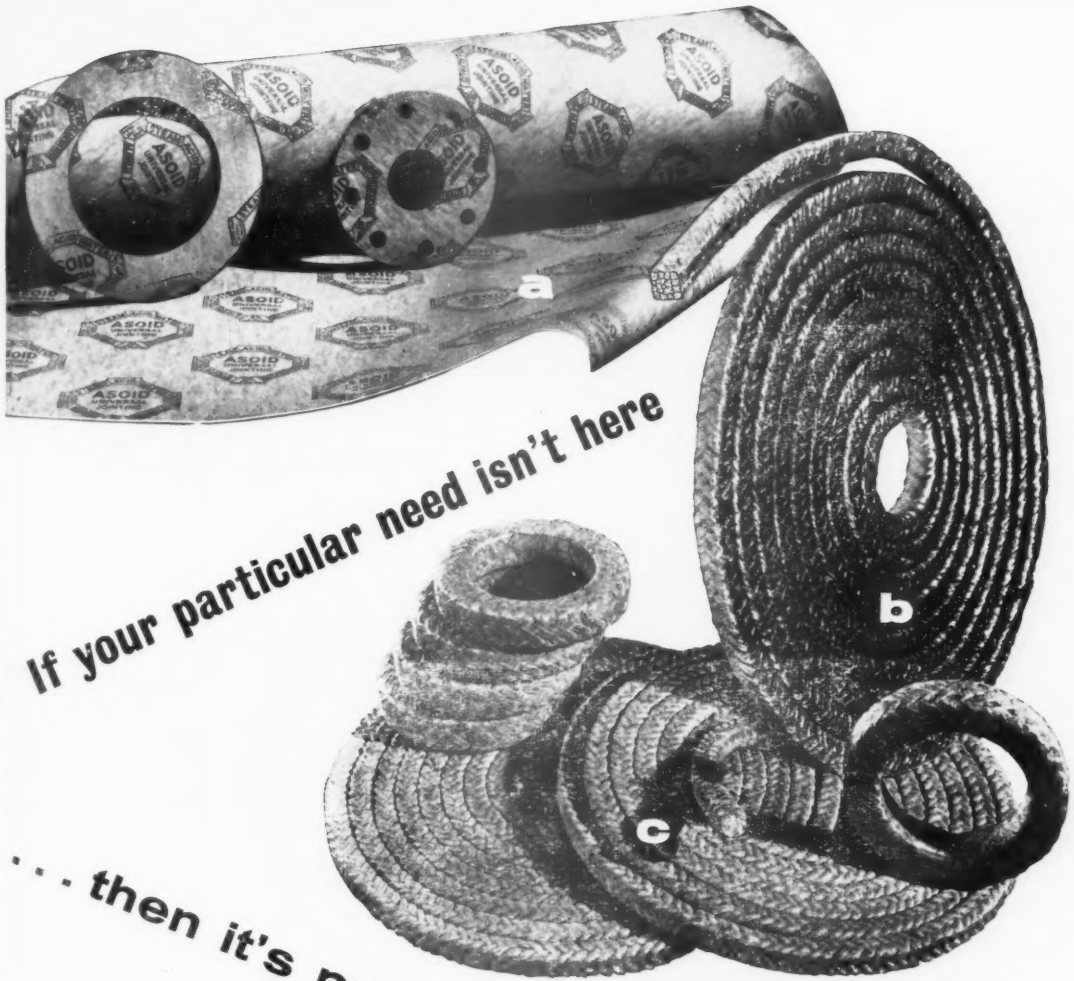

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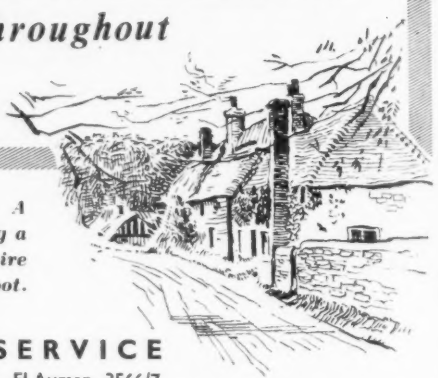

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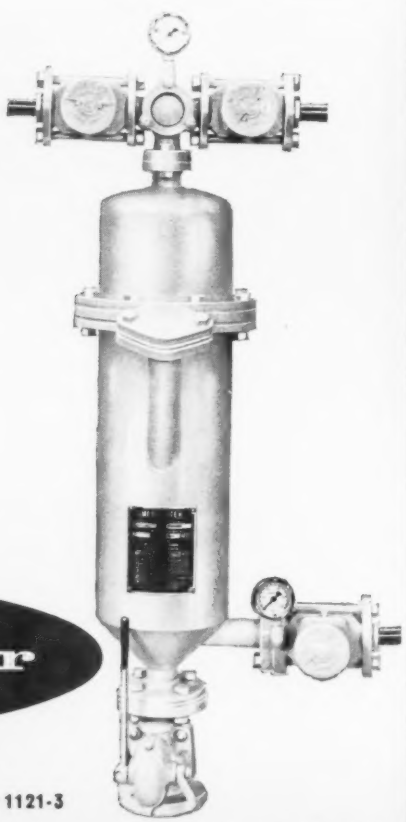

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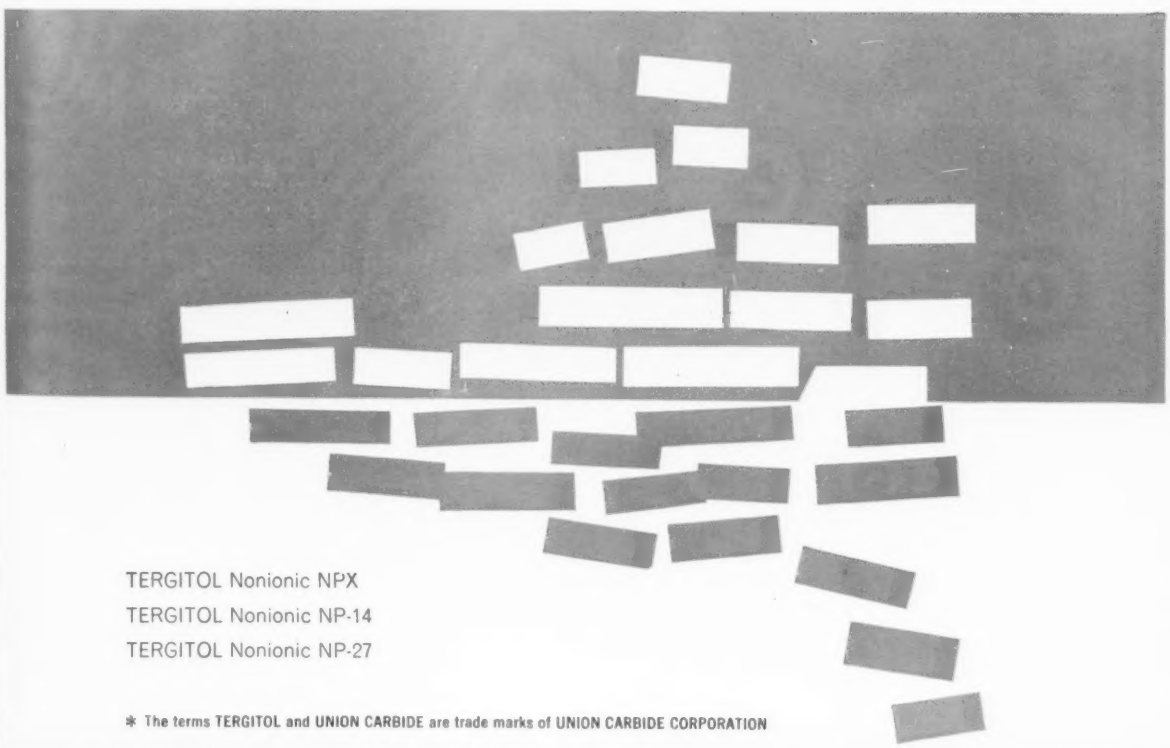

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THE INSTITUTE OF PETROLEUM
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Volume 15, No. 171 March 1961

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Pitch and Gloss

By OWEN COLVERD

My letters on Petroleum History (*IP Review*, 1960, **14**, 343) established proof from British Court records that James Young started to manufacture and market oil from coal suitable for burning in lamps, from the time his Bathgate Works first came into operation in 1851. From about May 1856 this same burning oil was given the brand name of "paraffine" to promote what we would now call better marketing.

The evidence also proved that James Young had manufactured and sold burning oil from Derbyshire petroleum from early 1848. Now it is proposed to tell the true story of what important events were taking place across the Atlantic from about that year of 1848 or a little later.

A geologist named R. C. Taylor had written in "an able work" published in 1848–9 that the Great Pitch Lake of Trinidad and similar deposits of bitumen or asphaltum in Barbados, etc., might well provide an almost unlimited source of illuminating gas superior in many ways to coal gas. About the same year Thomas Cochrane, tenth Earl of Dundonald, went to the American shores as British admiral commanding the North American and West Indies station. His appointment was to last only until 1851 and he was anxious to promote a project that would exploit the great pitch deposit of Trinidad for better purposes than the mere caulking the timbers of navy vessels. In Halifax, Dundonald met both Taylor and another geologist named Dr Abraham Gesner and it was the latter who accepted an engagement from Dundonald to investigate the Trinidad pitch and try to design a retort suitable for handling the pitch in a process of gas making at high temperatures.

The pitch as transported by navy vessels to dockyards was in a compact and very earthy form but Gesner designed a suitable retort and plant for piping the resultant gas to storage and then to jets for burning and giving a fine illumination. So, at the end of 1849, Gesner rushed off to New York, with drawings, specifications, a retort, and other plant, and in addition took with him a paper or article describing the Trinidad pitch, its value to commerce and industry, and the invention to turn it into illuminating gas which he now proposed to patent. He presented the article to "The Academy of Natural Sciences" of which he was a (corresponding) member. No record exists of the article appearing in the Academy's transactions.

In New York a firm that published a great periodical for technical readers was also equipped with a department that acted as patent agents aiding inventors in procuring U.S patents and Dr Gesner received much help from them. By 29 January 1850 Patent No 7052 was issued to Gesner for the manufacture of illuminating gas from bitumen. He claimed the use of compact and fluid bitumen, asphaltum, chapacote, or mineral pitch for this production of illuminating gas.

The new invention was written up in the periodical on 9 February 1850, and the following week a long article appeared giving most of the text of Gesner's own article mentioned above. Thus, we have solid evidence that Gesner actually beat Young to the patent office because it was not until 17 October 1850, that the latter was granted British Patent No 13292 for the production of oils and wax from cannel and other bituminous coals. Gesner had made a mistake in concentrating solely on illuminating gas just when Young was working on illuminating and lubricating oils, etc. Perhaps those writers of gloss presenting Young as having rushed to the patent office to beat an inexperienced academician will kindly notice.

The article in the issue of 16 February 1850, mostly using Gesner's own words, makes known the fact that he at first was concerned with the compact and very earthy nature of the pitch as produced by the navy and set out to clarify it. Heat soon melted the pitch and on allowing it to stand the earthy matter separated from it. Gesner recorded that when the thus clarified pitch is allowed to cool, "it is lusterous and partakes of the nature of oil and wax, from which circumstance (I) call it Kerosene. But it does not require this preparation to make gas . . ." The editor of the periodical gave the article a heading, thus—"Dr Gesner's Kerosene Gas Light."

Very many readers will be astonished to learn that the word kerosene was coined because of the gloss on a mass of cooling pitch that was free of any earthy matter, and that it appeared in print on 16 February 1850 to denominate clarified

Trinidad pitch which looked to Gesner very much like a heated mixture of beeswax and turpentine—for that is what he meant in 1850 by "oil and wax," a common enough substance used for polishes, etc. He made no explanation as to the origin of constituent parts of the word kerosene. Since the article is from a paper presented to a learned Society it was no doubt thought unnecessary. The Greek word "keros" plus an ending "ene", already fairly common in use in 1850 for substances of similar nature, was quite simple. No one could have guessed what was to come a few years later and how glosses of a specious or plausible nature would be invoked.

Finding Trinidad pitch varied too much to be practical in the long run, Gesner and associates looked nearer home for bitumen and in 1850 a bituminous mineral was found to exist in Albert County of New Brunswick. Certain writers have declared this to be a Gesner discovery but the record shows this to be wrong. It was described by Chas. T. Jackson, a geologist of great repute who resided in Boston and had suffered through glosses perpetrated by Gesner himself. He called it Albert Coal. Many years later it became known as Albertite. A lawsuit known as the Albert Mine Case of 1852 debarred Gesner from getting this mineral except at a prohibitive price. The project for formation of a Asphalt Mining and Gas Light Company was delayed.

Meanwhile, the Scottish Boghead Coal Case in Britain constituted a threat to Young, should it be held by the Courts there that Boghead was in fact, *not a coal*. Certain gas and chemical works in Britain were awaiting a decision and hoped to switch to mineral oil manufacture if the case was decided that way. They were already buying Boghead "to enrich the gas from other coals." An exactly similar situation was developing in the U.S.A. which also was buying Boghead from Scotland. Young covered his invention by a U.S. Patent in 1852. However, the Court decided that Boghead was indeed a coal, no matter what the experts said about it, and this result was known in most parts of the world during 1853.

Gesner and his friends decided thorough investigation should be made into the possibilities of making illuminating oil from anything that seemed likely raw material provided it could not be designated a coal. The Albert mineral gave oily products when subjected to retorting at a low red-heat as specified in Young's patent, but it was definitely a coal by a decision at law. One solution was to find an "improvement" that would hold up under legal inquiry as not an infringement of Young's patent. Gesner theorized apparently that products somewhat dissimilar to Young's would be best.

He became obsessed with a desire to imitate a burning fluid already selling in large volume on the American markets called "Camphene." That this word had the ending "ene" like other hydrocarbon substances is quite important. It consisted, as one might well imagine, of rectified oil of turpentine and alcohol with perhaps other substance(s) Gesner experimented therefore to obtain light naphthas similar to oil of turpentine by distillation at low red heat from bituminous substances, maltha, and petroleums, and these are all mentioned in the patents he took out in 1854. In refining the distillates he used acid and alkali but an "improvement" in the form of peroxide of manganese was no doubt of no use whatsoever.

He obtained three oils, two of which, when mixed with alcohol were good illuminants when burned in one or another form of burner. A heavier oil was "itself insoluble in alcohol" but would "burn in an Argand lamp with a button over the wick." He, or his associates, decided to employ a brand name in the patent specifications and calculated that some reflected gloss would accrue if a name *like* Camphene were used. Not having yet abandoned the gas project entirely the word "gas" still figured in the company title and Kerosene Gas was known to many. The outcome was to call the new oil products KEROCENE's, spelling that word with a "c" in place of the "s". The idea was that this name was a combination of keros with the abbreviation c'ene after deleting "s" from the first keros.

Reference to the report of the Commissioner for Patents in Washington for the year 1854, published 29 January 1855, shows definitely that the patent application was made and the patents issued in June 1854, using the word kerocene spelt with a "c" throughout the document. So patent Nos 11,203 to 11,205 were issued for Kerocene A, Kerocene B, and Kerocene C respectively, with "A" the light oil and "B" the medium, both mixing with alcohol to give illuminants, whilst "C" was "non-inflammable" but suitable for burning in an Argand lamp. The patents were all assigned, together with the Kerocene brand name, to the Asphalt Mining & Kerocene Gas Co, of Williamsburg, N.Y. Gesner was assured of a job with that company.

There is an anti-climax to this matter of the name because, for a reason that is somewhat obscure, the company decided by the end of 1854 that it was not advisable to have the two spellings. Two words almost exactly alike but meaning two entirely different things was confusing so they decided to call the new oils kerosene and they hoped that its original meaning would be forgotten. When the time arrived under the Patent Law for the full specifications for Nos 11,203–5 to be enrolled (early in 1855) the names throughout were officially confirmed to be kerosene and not keroCene. So it is an historical fact that kerosene was the name applied to burning fluids produced under Gesner's process for the first time during the year 1855—and between 1850 and 1855 the word merely meant a clarified pitch from which gas could be made.

Although Gesner was engaged to superintend the building and operating of a suitable works on Long Island, N.Y., his "improvements" were a failure and Young's were employed. The kerosene was first marketed about March 1856, at which date Young had been marketing burning oils from Boghead cannel coal for five years and it was eight years since Young had commenced selling such oils from petroleum made at the Derbyshire petroleum works. Now the Gesner Company became the New York Kerosene Co in due course. It had to take a licence from Young and it imported much Scotch Boghead cannel coal to make kerosene, thus sending the price of the coal up to a high figure and causing Young to turn his attention to bituminous shale in 1859.

Finding himself out of employment Gesner wrote a book. In it he wrote numerous glosses but he also included casual references and the shortest known gloss about the word Kerosene, which led to the most extraordinary explanations by historical writers in the years to come. The book is generally referred to as "Gesner's Treatise" on oils distilled from coal and petroleum, etc. It appeared in New York in 1861 when such great interest was being taken in U.S. petroleum. In the book he takes the earliest opportunity to claim to have been the first to "manufacture oils from coals in America," and further that "Oil from coal was made and consumed in lamps by him at his public lectures . . . in August 1846 . . ." He claimed that records of this were then extant but none of his greatest admirers has ever been able to produce them, so far as can be ascertained. When introducing Kerosene he says that the manufacture of lamp oil in 1846 from coals subsequently led to his obtaining patents for

improvements in these oils; "the oils are now (1861) sold under the denomination of kerosene oil."* The asterisk referred to a footnote, thus:—

*from κηροσ wax, and ελαιομ oil.

and nothing more than that. There is no doubt that this gloss was calculated to do just exactly what it accomplished namely cause a great number of people to argue and write and theorize as to how the Greek word "elaion" meaning oil could have become a simple suffix or word-ending like "ene". Gesner's object was to make one think that OIL had been his special subject right through from 1846 to the 1854 patent period. But then again a little later in the "Treatise" he says, in regard to the bitumen of the Pitch Lake of Trinidad that "It was from this bitumen that the author first obtained kerosene, which differs in some degree from coal oil". He refrains from saying just HOW he obtained kerosene from pitch. A curtain is drawn over all that and also over gas making. It is all to give a lasting impression that oil and only oil—kerosene oil, of course—was his sole invention. He wanted no credit for the lesser things.

The glosses of various historical writers down the years make a rather amusing story of pitch and gloss and *what a tale of pitch and gloss!* Thus, Wilson and Fiske in their Cyclopeadia about 1894, wrote:—

(*A*) In 1851 he experimented with Trinidad Asphalt and obtained from it an illuminating oil. Subsequently he distilled an oil suitable for burning in lamps from cannel coal, thus originating in America the discovery of kerosene . . ."

Then his son in 1896 in a paper read to the New Brunswick Natural History Society said:—

(*B*) At Halifax in 1850 he met Lord Dundonald . . . who was the original discoverer of illuminating gas, and with him examined the asphaltum of the pitch lake of Trinidad, and from it extracted a burning oil for lamps. Afterwards he extracted an illuminating oil from coal and other bituminous substances, and in 1854 patented it under the name of Kerosene in the U.S.A. This invention laid the foundation in America . . . of the enormous petroleum industry as it now exists".

The two outstanding glosses in (*B*) make G. W. Gesner a most unreliable man. Dundonald did not discover illuminating gas (neither did his father!) and Gesner most certainly cannot be accorded the honour given him here. The New Brunswick Natural History Society was constrained to write Washington for confirmation of the claim about founding the petroleum industry. A useless reply was forthcoming and members were asked to pay ten cents a copy for patents! Next we find recent historians such as "one of the foremost scholars of the Penna oil region" writing in 1938—

(*C*) On this side of the Atlantic, (he) . . . was the first to produce an illuminating oil from coal. About 1846 he obtained oil from albertite, a bituminous mineral from Albert County, N.B., and exhibited samples of it during some public lectures . . .

Since albertite or Albert coal as it was originally called was unknown before 1850 we have to class this as inaccurate gloss.

Of the many passages written in articles celebrating the "centenary of the industry" in 1959 we need only notice a portion of one printed in *World Petroleum* in June that year:—

(*D*) As early as the summer of 1846, he demonstrated at public lectures . . . an illuminating oil he had distilled from asphalt from the Great Pitch Lake of Trinidad. In 1849, Gesner discovered a vein of bituminous rock called Albert coal or albertite . . . making a satisfactory lamp oil from it.

It is a pity that all these pitch glosses have not cancelled each other out and the reason they have not done so is that no one has put them together in one article before. It is believed that this exposure of pitch and coal glosses will leave it clear that the only reliable fact is that the gloss *on* the pitch really caused Gesner to coin the word Kerosene. One slight doubt remains—did Gesner coin the word, or was it Dundonald who is more likely to have had a classical education?

In conclusion, thanks are due to those who provided material of value to the writer—W. A. Squires, Curator of the New Brunswick Museum, St. John; chiefs of photo-duplication services of various libraries including Library of Congress, Washington, and the Public Library of New South Wales, Australia.

★ ★ ★

ASTM PETROLEUM STANDARDS 1960

The 1960 edition of the *ASTM Standards on Petroleum Products and Lubricants* contains 168 standards of which some 31 are new, revised, or have had their status recently changed. Published for the first time in two volumes, volume I contains in its 1130 pages most of the ASTM standards on petroleum including crude petroleum, butadiene, motor and aviation fuels, naphthas, diesel fuels, lubricating oils, industrial oils, cutting oils, turbine oils, greases, waxes, spray oils, and other related materials. It also includes methods of testing, specifications, definitions, charts, tables, and eleven extensive appendices containing proposed methods. Typical of some of the new standards included in the book are: Water and Sediment in Fuel Oils by Centrifuge; Luminometer Numbers of Aviation Turbine Fuels; Refractive Index of Viscous Materials; and Oil Separation from Lubricating Grease During Storage. Price of the volume is $9.50 and it can be ordered from the ASTM, 1916 Race Street, Philadelphia 3, Pennsylvania, U.S.A. Copies are also available from the IP offices, price £3 10*s*.

It is hoped that volume II will be available shortly. It will contain a number of standards prepared by other ASTM Committees and used in the petroleum industry. The following list shows the general subjects covered by the standards in volume II and the related Committees: solvents (D–1), gaseous fuels (D–3), bituminous road and paving materials (D–4), waterproofing and roofing materials (D–8), electrical insulating oils (D–27), industrial aromatic hydrocarbons (D–16), wax polishes (D–21), general methods of test (E–1), nomenclature and definitions (E–8), quality control (E–11), and absorption spectrometry (E–13).

U.K. TEL EXPORTS

Exports of tetraethyl lead from the U.K. in 1960 totalled 6,542,959 gallons, an increase of 309,944 gallons or 5 per cent compared to the 1959 figure of 6,233,015 gallons. The corresponding value was, at £12,739,021, a rise of £28,907.

Around the Branches

ABADAN, BAHRAIN, ESSEX, FAWLEY, KUWAIT, LONDON, NORTHERN, SCOTTISH, SOUTH-EASTERN, SOUTH WALES, STANLOW, TRINIDAD, YORKSHIRE

South Wales Branch

J. M. Harris of Shell-Mex and B.P. Ltd, spoke to the Branch about "The Philosophy of Lubricants Quality Control" on 15 December last.

During the four years which had elapsed since he had presented his paper to the Northern Branch of the Institute many interesting developments had taken place and in his talk he outlined the various methods of quality control and the stages at which they were used. Quality control of basic oils at the refinery he said, did not require elaborate methods of test, and these were formulated by individual refineries.

Standards of quality control at the many blending installations throughout the country varied with the type of equipment used. Installations handled a large number of grades and these were listed in Cardex systems which contained details of blend composition, and the main control tests.

Mr Harris used slides to illustrate the durations of lubricating oil tests. As some of these were time-consuming, he said that efforts were being made to develop shorter methods of test. These included a shorter method for oxidation stability, a direct spectrograph for estimating the metallic constituents of blends, and the Ferranti-Shirley viscometer for quicker viscosities. Certain specialized tests were required for additives but these were kept to a minimum. Air Ministry lubricants were handled and tested under AID regulations which were somewhat more elaborate than normal methods.

Mr Harris concluded by referring to the drafting of lubricant specifications which, he said, the manufacturing company did not always control because they were to some extent dependent on the whim of the customer. Although this resulted in some anomalies they were becoming less frequent.

Northern Branch

W. E. Marrian of the British Transport Commission spoke to the Northern Branch on 17 January about "Railway AC Main Line Electrification".

He divided his talk into four sections, covering civil work, signals, distribution, and rolling stock. He said that the fuel situation in Britain pointed to the use of electricity as the future source of motive power, although the idea was far from new as an electric loco was in existence in 1842 and the City and South London Tube came into being in 1890. The main reasons for the adoption of the 25,000 volt ac overhead system were outlined and the various intricacies of installation and operation were described.

Illustrating the factors which had influenced the scheme, Mr Marrian said that the biggest feat since the introduction of the standard gauge was the adoption of the fully braked freight trains which enabled the railways to move everything at higher speeds, calling for greater reliability all round. The life of rolling stock is of the order of 40 years.

Electric locomotives were extremely versatile machines and, because the prime mover is at the power station, the limiting factors in the power which could be applied at a locomotive were rail-tyre adhesion and the pull on the draw bar.

One of the standard types of locomotive is particularly economic because it can be used for all kinds of work. A second multiple unit type, used for local services, consists of a four-car self-contained set which can be coupled in multiples of four, to give the same performance as a single set. Although in both types of stock there is simplicity of control, considerable care is taken in training drivers over a period of five weeks.

Maintenance of the new stock consists mainly of a weekly routine inspection in clean, smoke-free depots. Moving parts are few and the driving motor is expected to operate for long periods without attention.

Mr Marrian's talk was illustrated by slides, and a film depicting the introduction of the Midland Pullman which described the research undertaken to ensure a high standard of comfort for passengers on the service.

London Branch

The London Branch are again to be congratulated on the success of their Annual Dinner Party held on 24 January at the Chatham Rooms Restaurant, London. Each year the style of the entertainment provided takes a different form. This year it was dancing, with a cabaret in which members of the industry were the artistes. Thus, Patricia Vass (Gulf Oil) rendered several songs in an excellent manner, Stanley Dodds (Gulf Oil) and Norman Walters (a member of the Branch Committee) individually and as a duet sang some comedy numbers, the latter also contributing a flute solo. The applause after each item left no doubt as to the delight of the audience.

Dancing was to the music of Michael Williams' Quartet and included several novelty dances. Thus, the "Snowdrift Dance" provided an opportunity for the distribution of prizes donated by Snowdrift Lubricants Ltd, and awarded for the least reason possible. It was not surprising perhaps that, when the MC offered a prize for a gentleman dancing with someone else's wife, there was a rush forward which left the dance area almost bereft of men. On the other hand it was to be expected that a prize for a "lady wearing a red flannel petticoat" was unrewarded. There was also a distribution of gifts from various other companies.

And so the evening went on and "Auld Lang Syne" at eleven came all too quickly, even for the stalwarts at the bar. George Yeomans, who was Master of Ceremonies, is to be congratulated on having organized another successful London Branch Dinner Party.

AT THE LONDON BRANCH DINNER PARTY

Entertainment was provided by **Stanley Dodds** (left), *with, for one turn, the aid of* **Norman Walters**, *and* **Patricia Vass** (right), *while at one stage the male population demonstrated the alacrity with which they could change head dress. As will be seen* (centre) *the latest creations were available for this purpose. The pictures below indicate how different groups filled in intervals, with and without nourishment. Some appear to have indulged in serious conversation—most were not so serious*

Photos by George Sell

Scottish Branch

Dr W. B. Peutherer, chairman of the Scottish Branch, presided at a meeting held in the Recreation Hall, Grangemouth Refinery on 19 January, and introduced William Gray, M.A., B.Sc., F.R.Met.S., who spoke to members on the subject of "Weather". He said that down the centuries, man has always been interested in "the weather", principally on account of the effects of the seasons upon the industry in which he was engaged.

In bygone days the majority of people were outdoor workers. Hustle was unknown, and they had ample time to watch the ever changing aspect of the sky. Hence the numerous weather sayings that have been put on record, not only in Britain, but also on the continent of Europe. Most of these weather rules or laws have come under modern mathematical analysis, and in the vast majority of cases correlation tests have shown that they cannot be relied upon—in fact, quite a large percentage of them have given results which condemn them.

The atmosphere, where "weather" moves and has its being, is one vast ocean of mixed gases, of which nitrogen and oxygen form the largest proportion. No one, as yet, knows how deep this ocean is and it is doubtful if it will ever be determined, so attenuated does the air become the further one goes from the earth. What is known, however, is that the atmosphere is built up in layers, each of which possesses its own very definite characteristics. The layer in contact with the earth's surface is known as the troposphere, and it is in this layer alone that all weather phenomena take place.

The fall of temperature with height, in this particular layer, is of the order of 3°F per 1000 feet.

The "thickness" of the troposphere is about 10 miles at the equator, and 6½ miles at the poles. The layer above the troposphere is free of all weather—hence the advantages of stratospheric flights. Temperatures in it are more uniform and have been subjected to a rise at the boundary. The air is very "thin", of course but extremely dry. These two layers are particularly interesting to meteorologists because there are great possibilities of the further development and improvement of weather forecasts when more is known about them.

The troposphere contains many large whirlpools of air in which the weather is far from pleasant. These are classed as depressions. On the other hand, and not very far away from them, are regions of moderate circulation —clockwise in this case—where generally dry weather is the rule, and these regions are known as anticyclones.

Weather charts are made at regular intervals and are known as synoptic charts. The forecaster uses them to estimate, to the best of his ability, what changes and developments are to be expected for the next 12 or 24 hours. His forecast must state the likely force and direction of the wind, the state of the sky and any changes probable, and remarks upon such phenomena as rain, snow, fog, thunderstorm, frost, etc. The accuracy of forecasts is much greater nowadays than formerly, but the meteorologist has still a very long way to go before his predictions can be classed as infallible. Sufficient knowledge of the physical process of the atmosphere is not yet known to avoid the occasional failure of a weather forecast.

Stanlow Branch

The last Stanlow Branch meeting of 1960 was held on 14 December at the Administration offices, Stanlow Refinery. The chair was taken by C. N. Thompson who introduced the speaker A. B. Crowe who presented a talk on "Life in an Overseas Refinery".

Mr Crowe told of life in Venezuela and outlined the geography and general historical development of the country. He went on to refer to Cardon refinery in particular and described working conditions there.

The talk was illustrated by coloured slides and was followed by a most interesting and enjoyable discussion.

AGM

At the Branch AGM held in the Lecture Theatre, Grosvenor Museum, Chester, on 20 January, Messrs Brooman, Swain, and Taylor were re-elected to the committee. C. Rose was elected to the committee in place of Mr Pickering who had left the area to take up a position in London.

THE FIFTH WORLD PETROLEUM CONGRESS

STATEMENT OF RECEIPTS AND EXPENDITURES

6 JUNE 1956—30 JUNE 1960

(U.S. dollars)

	Total	*General*	*Proceedings*	*Exposition*
Receipts				
Contributions	560,759·15	560,759·15		
Registration	75,945·00	75,945·00		
Banquet	24,585·50	24,585·50		
Preprints—Proceedings	82,161·69		82,161·69	
Exposition space ...	284,857·00			284,857·00
Miscellaneous	10,835·38	10,835·38		
Total receipts ...	1,039,143·72	672,125·03	82,161·69	284,857·00
Expenses				
Administrative:				
Salaries and fees ...	228,590·64	128,214·01	53,428·70	46,947·93
Travel	41,319·25	25,473·07	7,979·30	7,866·88
Office rent and maintenance	51,608·22	41,286·58	5,160·82	5,160·82
Office expense	58,794·01	47,035·21	5,879·40	5,879·40
Outside services ...	32,234·69	25,787·75	3,223·47	3,223·47
Events/banquet ...	97,391·54	97,391·54		
Foreign financial aid ...	8,100·00	8,100·00		
	518,038·35	373,288·16	75,671·69	69,078·50
Printing:				
Preprints—proceedings	166,371·62		166,371·62	
Other	46,321·16	37,056·92	4,632·12	4,632·12
	212,692·78	37,056·92	171,003·74	4,632·12
Meeting Expense:				
Coliseum rent	63,500·00	31,750·00		31,750·00
Construction—furn. ...	123,496·37	123,496·37		
Cleaning	7,575·00	3,787·50		3,787·50
International Exposition Co.	106,828·46			106,828·46
Henry Hudson ...	565·00	565·00		
Carnegie Hall	3,140·45	3,140·45		
	305,105·28	162,739·32	—	142,365·96
Sixth WPC Expense (deferred)	3,307·31	3,307·31	—	—
Total Expenses ...	$1,039,143·72	$576,391·71	$246,675·43	$216,076·58
Net operations ...	0	95,733·32	(164,513·74)	68,780·42

World Oil Production in 1960

World production of crude oil exceeded 1000 million tons for the first time in a single year in 1960. According to the *Petroleum Press Service* output was 73,333,000 metric tons, or 7·5 per cent, higher than in 1959 and reached 1,051,746,000 tons. This is more than double the figure for 1950.

Production in the Western Hemisphere rose by only 1·5 per cent. By contrast the non-Communist countries of the Eastern Hemisphere achieved a 16·7 per cent increase and the Communist countries a 13·3 per cent increase. Six-sevenths of the world's crude oil came from non-Communist countries and 75 per cent of the 1960 increase occurred in the free world outside the U.S.A.

The largest increase in volume occurred in the Middle East where crude oil production was 35,972,000 tons, or 15·6 per cent higher at 266,900,000 tons. This represented a three-fold increase over the past ten years. Rate of expansion in the Middle East is expected to ease in the future however, as the growth in European consumption will not be as rapid as previously, and there will be increasing supplies from the French Sahara, Russia, and, for the first time, Libya.

In the United States ouput fell slightly by 2,073,000 tons, and the small increase of 3 per cent in Canada was entirely due to exports to the U.S.A. Venezuelan expansion tended to be restricted by government pricing policy and external factors, including import restrictions in the U.S.A., so that production rose by only 3 per cent.

U.S.S.R. crude oil figures rose by 17,500,000 tons and since 1950 output has increased almost four times. If present trends continue Russia will soon supplant Venezuela to re-establish herself as the second largest oil producing nation after the U.S.A.

African crude oil, excluding Egyptian, rose by 273 per cent to 10,320,000 tons. In Algeria and the French Sahara output rose from 1,303,000 tons to 8,400,000 tons to record a spectacular 545 per cent increase. And in 1961 production in the Sahara is expected to reach at least 18 million tons.

In Western Europe and the Far East output continued to climb, and in 1960 increases of 10·9 per cent and 2·3 per cent respectively were achieved.

Continued expansion in the world's crude oil production is forecast for 1961, but with the growth of world trade tending to ease the increase is expected to be below the 1960 level.

WORLD: ESTIMATED CRUDE OIL PRODUCTION
(Thousand Metric Tons)

	1958	1959	1960	1960 Per cent change 1959	1960 Per cent of total
NORTH AMERICA:					
U.S.A.: West of Rockies	42,395	41,430	41,000		
East of Rockies	287,726	305,643	304,000		
	330,121	347,073	345,000	0·6	32·6
Canada	22,283	24,875	25,700	+ 3·3	2·6
	352,404	371,948	370,700	0·4	35·2
LATIN AMERICA:					
CARIBBEAN AREA					
Venezuela	138,636	146,573	151,000	+ 3·0	
Colombia	6,631	7,581	8,070		
Trinidad	5,342	5,904	6,050		
Cuba	49	27	20		
	150,658	160,085	165,140	+ 3·1	15·7
OTHER COUNTRIES					
Mexico	13,331	13,716	14,500	+ 5·7	
Argentina	5,114	6,350	9,000	+ 41·7	
Brazil	2,473	3,083	4,000	+ 29·8	
Peru	2,515	2,377	2,400		
Chile	726	837	1,000		
Bolivia	450	413	420		
Ecuador	406	363	365		
	25,015	27,139	31,685	+ 16·8	3·0
MIDDLE EAST:					
Kuwait	70,217	69,533	84,000	+ 20·8	
Saudi Arabia	50,128	54,162	61,500	+ 13·5	
Iran	40,590	45,630	52,000	+ 14·0	
Iraq	35,670	41,730	48,000	+ 15·0	
Qatar	8,222	7,993	8,300		
Kuwait Neutral Zone	4,258	6,051	7,000		
Egypt	3,165	3,076	3,350		
Bahrain	2,035	2,253	2,250		
Turkey	328	372	360		
Israel	89	128	140		
	214,702	230,928	266,900	+ 15·6	25·4
AFRICA (EXCL. EGYPT):					
Algeria and Sahara	429	1,303	8,400	+ 545·0	
Nigeria	265	570	900		
Gabon/Congo (ex-French)	505	753	850		
Morocco	75	94	100		
Angola	51	50	70		
	1,325	2,770	10,320	+ 273·0	1·0
W. EUROPE:					
Germany	4,432	5,103	5,500		
Austria	2,836	2,459	2,400		
France	1,621	1,622	2,000		
Italy	1,534	1,695	2,000		
Netherlands	1,386	1,773	1,900		
Yugoslavia	462	592	900		
U.K.	81	84	90		
	12,352	13,328	14,790	+ 10·9	1·4
FAR EAST (*a*):					
Indonesia	16,109	18,215	19,500	+ 7·0	
Br. Borneo	5,269	5,449	4,650	− 14·7	
Burma	453	508	520		
Japan	367	406	500		
India	426	442	440		
Pakistan	303	319	321		
W. New Guinea	275	245	230		
	23,202	25,584	26,161	+ 2·3	2·5
FREE WORLD:					
Western Hemisphere	528,077	559,172	567,525	+ 1·5	53·9
Eastern Hemisphere	251,581	272,610	318,171	+ 16·7	30·3
Total	779,658	831,782	885,696	+ 6·5	84·2
of which: outside U.S.A.	449,537	484,709	540,496	+ 11·5	51·6
EASTERN EUROPE AND CHINA:					
U.S.S.R.	112,900	129,500	147,000	+ 13·5	
Rumania	11,336	11,437	11,550		
Hungary	829	1,036	1,200		
Albania	403	479	600		
Poland	175	175	200		
Bulgaria	222	194	190		
Czechoslovakia	110	110	110		
China (*b*)	2,230	3,700	5,200		
	128,205	146,631	166,050	+ 13·3	15·8
WORLD TOTAL	907,863	978,413	1,051,746	+ 7·5	100·0

(*a*) There is also very small production in Formosa, Thailand, and New Zealand.
(*b*) Including oil from shale and coal.

Petroleum Trade of the United Kingdom in 1960

U.K. imports of crude petroleum and liquid petroleum products reached 15,151 million gallons during 1960 according to provisional figures issued by the Board of Trade*. This was 12·3 per cent above the 1959 level and means that petroleum imports have increased by almost one third since 1958.

Imports of crude and partly refined petroleum totalled over 11,627 million gallons, 14·4 per cent higher than in 1959. Motor spirit, kerosine, diesel oil, and lubricating and other heavy oils were all below the previous year's level, however, as can be seen from Table I which gives full details of U.K. petroleum imports.

TABLE II
PERCENTAGE IMPORTS OF PETROLEUM INTO THE U.K.

	1960	1959	1958
Crude petroleum	76·7	75·4	75·2
Motor spirit	5·1	6·5	6·2
Other spirit	0·6	0·3	0·3
Kerosine	1·4	2·7	2·7
Gas oil	3·8	4·1	4·5
Diesel oil	0·1	0·4	0·2
Fuel oil	11·4	9·5	10·0
Lubricating oil	0·9	1·1	0·9
	100·0	100·0	100·0

* Trade and Navigation Accounts of the United Kingdom, December 1960. H.M.S.O. 22*s* 6*d*.

Imports of the solid products, petrolatum, paraffin wax, and other petroleum wax, rose during the year. But for the second successive year the value of unspecified products fell. The 1960 decrease of £244,558 was only a minor one, however, compared with the £1,305,453 drop the year before.

The various liquid products are shown as percentages of the total imports in Table II.

TABLE III
AVERAGE CIF UNIT VALUES OF U.K. PETROLEUM IMPORTS

	1960	1959	1958
	£ *per* 1000 *gal*		
Full and topped crude	28·14	30·52	33·32
Other crudes	44·92	42·80	45·10
Motor spirit	51·71	53·80	55·57
Other spirit	46·30	65·66	69·93
Kerosine	48·28	50·08	48·07
Gas oil	43·17	46·67	46·18
Diesel oil	42·20	43·78	46·46
Fuel oil	27·79	29·38	32·05
Lubricating oil	94·37	78·14	95·13
	£ *per cwt*		
Petrolatum	4·29	4·30	4·00
Paraffin wax	3·11	3·31	3·37
Other petroleum wax	1·21	1·31	5·16

TABLE I
QUANTITY AND VALUE OF U.K. PETROLEUM IMPORTS

	1960		1959		1958	
	Quantity 1000 *gal*	*Value* £	*Quantity* 1000 *gal*	*Value* £	*Quantity* 1000 *gal*	*Value* £
Crude petroleum:						
Full and topped crudes	11,227,113	315,969,065	9,936,194	303,258,357	8,449,394	281,521,721
Other†	399,945	17,966,171	226,458	9,693,447	290,967	13,121,262
	11,627,058	333,935,236	10,162,652	312,951,804	8,740,361	294,642,983
Refined petroleum:						
Motor spirit‡	766,991	40,706,047	873,335	47,008,986	721,219	40,079,052
Other spirit	85,026	3,936,463	34,017	2,233,577	36,096	2,522,667
Kerosine	205,062	9,900,275	362,391	18,151,470	313,829	15,086,140
Gas oil	581,709	25,113,640	554,201	25,866,498	523,435	24,171,086
Diesel oil	19,715	831,899	60,586	2,652,292	22,101	1,026,882
Fuel oil	1,727,473	48,010,661	1,283,538	37,705,628	1,154,758	37,008,325
Lubricating and other heavy oils	137,561	12,982,045	154,597	12,080,082	102,719	9,771,214
TOTAL	15,150,595	475,416,266	13,485,317	458,650,337	11,614,518	424,308,349
	Cwt		*Cwt*		*Cwt*	
Petrolatum	126,533	543,098	111,116	477,933	109,524	438,364
Waxes:						
Paraffin wax	714,688	2,219,759	647,914	2,145,582	604,597	2,035,814
Other petroleum wax	1,215,149	1,469,637	1,099,194	1,444,254	139,092	717,270
All other refined petroleum products, not elsewhere specified, and pitch (excluding natural asphalt and bitumen)	—	2,745,081	—	2,989,639	—	4,295,092
TOTAL	—	£482,393,841	—	£465,707,745	—	£431,794,889

†Includes refinery feed but excludes unfinished oil for blending.

‡Including blending components.

Value of Imports

The cif values of crudes listed as "other crudes", and lubricating oil were higher than in 1959, but generally cif values of other liquid products tended to fall as can be seen in Table III. The values of the solid products were mainly similar to those of the previous year.

TABLE IV
COUNTRIES CONSIGNING PETROLEUM TO THE U.K.

Country and Product	*Thousand gallons*		
	1960	1959	1958
KUWAIT:			
Crude petroleum	5,697,716	4,231,108	4,003,432
VENEZUELA:			
Crude petroleum	1,372,865	1,373,024	1,169,436
Kerosine	—	35,414	41,606
Gas, diesel, and fuel oils ...	574,704	426,531	215,251
Lubricating oil	16,254	13,524	14,159
	1,963,823	1,848,493	1,440,452
IRAQ:			
Crude petroleum	1,849,716	1,690,813	1,459,983
IRAN:			
Crude petroleum	1,369,234	1,487,579	1,327,989
Motor spirit	5,489	18,489	15,913
	1,374,723	1,506,068	1,343,902
BAHRAIN, QATAR, AND TRUCIAL STATES:			
Crude petroleum	164,327	404,109	184,483
Motor spirit	128,929	110,203	115,412
Kerosine	39,367	35,600	25,381
Gas, diesel, and fuel oils ...	166,129	129,863	80,992
	498,752	679,775	406,268
TRINIDAD:			
Crude petroleum	132,594	1,089	—
Motor spirit	187,073	229,182	131,501
Kerosine	34,893	44,788	50,112
Gas, diesel, and fuel oils ...	370,438	342,256	185,597
	724,998	617,315	367,210
NETHERLANDS:			
Crude petroleum	86,470	25,503	52,814
Motor spirit	162,959	69,769	82,655
Kerosine	68,842	106,884	103,237
Gas, diesel, and fuel oils ...	398,876	338,776	519,739
Lubricating oil	20,368	26,650	13,900
	737,515	567,582	772,345
NETHERLANDS ANTILLES:			
Crude petroleum	126,766	98,214	160,746
Motor spirit	94,737	132,798	80,068
Kerosine	36,263	82,876	69,227
Gas, diesel, and fuel oils ...	158,729	162,385	120,370
Lubricating oil	33,330	24,683	22,310
	449,825	500,956	452,721
COLOMBIA:			
Crude petroleum	170,537	304,414	40,701
U.S.A.:			
Crude petroleum	15,103	14,105	15,477
Motor spirit	14,034	50,474	59,383
Kerosine	2,543	2,751	3,053
Gas, diesel, and fuel oils ...	18,677	83,383	108,829
Lubricating oil	42,989	39,404	39,001
	93,346	190,117	225,743

Country and Product	*Thousand gallons*		
	1960	1959	1958
SAUDI ARABIA:			
Crude petroleum	307,081	158,679	190,746
Gas, diesel, and fuel oils ...	13,123	7,883	31,953
	320,204	166,562	222,699
SARAWAK:			
Crude petroleum	30,809	147,510	47,105
FRANCE:			
Motor spirit	35,084	37,755	15,986
Kerosine	2,930	590	2,556
Gas, diesel, and fuel oils ...	55,341	56,773	103,640
Lubricating oil	9,253	3,690	3,202
	102,608	98,808	125,384
ITALY:			
Motor spirit	45,676	32,095	22,230
Gas, diesel, and fuel oils ...	49,304	80,149	85,570
	94,980	112,244	107,800
ADEN:			
Motor spirit	6,673	35,243	63,457
Kerosine	12,696	32,930	15,061
	19,369	68,173	78,518
PERU:			
Crude petroleum	42,629	34,688	30,217
WESTERN GERMANY:			
Gas, diesel, and fuel oils ...	11,280	11,596	6,167
SOVIET UNION:			
Lubricating oils	7,869	7,374	7,876
OTHER COMMONWEALTH COUNTRIES AND IRISH REPUBLIC:			
Crude petroleum	235,071	134,306	32,444
Motor spirit	11,717	6,906	2,989
Kerosine	16	276	41
Gas, diesel, and fuel oils ...	326,782	103,615	75,542
Lubricating oil	814	28,460	322
	574,400	273,563	111,338
OTHER FOREIGN COUNTRIES:			
Crude petroleum	26,140	57,511	24,788
Motor spirit	74,620	150,421	131,625
Kerosine	7,512	20,282	3,555
Gas, diesel, and fuel oils ...	185,514	155,115	166,644
Lubricating oil	6,684	10,812	1,949
	300,470	394,141	328,561

Bunker Oils

Oil fuel taken on board by fishing vessels and vessels engaged in foreign trade for their own use totalled 984,172,000 gallons in 1960. The 1959 total was 961,970,000 gallons. Vessels sailing under the British flag took on 685,027,000 gallons compared with 688,796,000 gallons in 1959.

Consigning Countries

After rising noticeably in 1959, imports from Iran; Bahrain, Qatar, and Trucial States; Netherlands Antilles; Colombia; Sarawak; and the unspecified foreign countries were all lower in 1960. An additional 1467 million gallons of crude came from Kuwait during the year, and the 320 million gallons from Saudi Arabia was almost double the 1959 consignments from that country. Imports from the Commonwealth and Irish Republic rose by 110 per cent, but those from the U.S.A. fell by slightly more than one half. Table IV contains the full details. It should be remembered that the consigning countries are not necessarily countries of origin.

Table V shows petroleum imports from the various producing areas. The Middle East contributed a slightly larger share than during the previous year, the percentage being almost on a level with that of 1958. Europe and the unspecified areas also contributed a larger proportion than in 1959. Although actual consignments from the Caribbean and Peru were higher, the proportion which they represented was lower than in the previous 12 months, in common with imports from the Far East and the U.S.A.

TABLE V

U.K. PETROLEUM IMPORTS BY ZONES OF CONSIGNMENT

	1960		1959		1958	
	Mil. gal.	*% of total*	*Mil. gal.*	*% of total*	*Mil. gal.*	*% of total*
Middle East ...	9760	64·8	8342	62·0	7515	64·9
Caribbean and Peru	3362	22·3	3306	24·6	2331	20·1
Europe	954	6·3	798	5·9	1020	8·8
U.S.A.	93	·6	190	1·4	226	2·0
Far East	31	·2	148	1·1	47	·4
Undisclosed areas ...	875	5·8	668	5·0	440	3·8

Re-Exports

Re-exports of petroleum products imported into the United Kingdom continued to be on a small scale as can be seen from Table VI.

TABLE VI

U.K. RE-EXPORTS OF IMPORTED PETROLEUM

	1960	1959	1958
	Thousand gallons		
Motor spirit	9,439	20,541	35,296
Gas, diesel, and fuel oils ...	39,180	100,556	61,137

Exports of Home-Produced Oil

Exports of U.K. refined products rose by 291,175,000 gallons in 1960. Small decreases in motor spirit and diesel oil exports were more than balanced by increases achieved by other products. See Table VII.

The average unit values of exports in £ per 1000 gallons were: motor spirit £46·8 (£47·6 in 1959); other spirit £96·0 (£101·5); kerosine £42·7 (£46·0); gas oil £37·0 (£41·4); diesel oil £35·1 (£37·1); fuel oil £22·4 (£23·0); lubricating oil £165·2 (£160·0); and, in £ per cwt, lubricating greases £4·6 (£4·5); and, £ per ton, bituminous asphalts £25·8 (£30·1); pitch £11·9 (£12·9).

TABLE VII

U.K. EXPORTS OF HOME-PRODUCED AND HOME-MANUFACTURED PETROLEUM

	1960		1959		1958	
	Quantity 1000 *gal*	*Value* £	*Quantity* 1000 *gal*	*Value* £	*Quantity* 1000 *gal*	*Value* £
Motor spirit	528,150	24,745,195	537,458	25,583,362	577,929	28,611,986
Other spirit	10,628	1,020,430	10,260	1,041,514	10,878	1,207,677
Kerosine	178,866	7,642,704	97,229	4,473,775	76,243	3,289,325
Gas oil	603,229	22,306,773	435,642	18,018,740	435,858	18,348,896
Diesel oil	105,782	3,710,848	115,359	4,283,680	126,073	4,728,559
Fuel oil	737,795	16,561,231	685,878	15,777,803	726,969	18,923,917
Lubricating oil	121,812	20,124,422	113,261	18,125,889	99,071	17,092,011
TOTAL	2,286,262	96,111,603	1,995,087	87,304,763	2,053,021	92,202,371
	Cwt		*Cwt*		*Cwt*	
Lubricating greases and compounds (including cable-impregnating compounds) ...	627,449	2,864,594	532,767	2,378,200	598,407	2,572,164
	Tons		*Tons*		*Tons*	
Bituminous asphalts (manufactured) and emulsions (other than for use as paint) ...	67,730	1,748,532	49,836	1,500,016	65,960	1,720,105
Pitch (other than natural asphalt and bitumen)	186,477	2,212,341	169,310	2,181,252	183,068	2,319,206
All other refined petroleum products not elsewhere specified, and crude petroleum ...	—	1,187,210	—	1,729,627	—	629,564
TOTAL	—	£104,124,280	—	£95,093,858	—	£99,443,410

Kuwait Annual Dinner

On 14 December 1960 the ninth annual dinner of the Kuwait Branch was held at the Employee Restaurant, Ahmadi, over a hundred members and guests enjoying a most excellent meal and the speeches which followed.

Among the guests present were J. C. B. Richmond, C.M.G., HM Political Agent in Kuwait; and Bader Abdulla Mulla Saleh, Said Omar, and D. C. McGregor, of the Kuwait Government Service; Sir Stephen Gibson, C.B.E., M.A., M.I.Mech.E., F.Inst.Pet.; and James Akins, the U.S. Consul in Kuwait. A letter had been received from Sir George Middleton, K.C.M.G., HM Political Resident, regretting his inability to attend.

Sir Stephen Gibson replying to the toast. Bader Abdulla Mulla Saleh of the Government of Kuwait; *and L. M. Craig*, chairman of the Kuwait Branch of the Institute of Petroleum, *are also in the picture*

The Oil Industry

The toast to the oil industry was proposed by J. C. B. Richmond. Even after many years spent in foreign service in oil countries, he said that he still had not mastered all of the industry's ramifications. No one, however, could fail to notice its advanced science, its enormous technical complexities, and the generosity of its members and committees! The scientific terminology of the industry, Mr Richmond continued, was a little beyond him, but he thought he might understand a little more oil language if some of the words remained in the original Greek from which they were derived. In amusing vein he quoted some examples and ended by proposing the toast to the prosperity of the oil industry.

L. T. Jordan replies

In his reply to the toast, L. T. Jordan, C.B.E., thanked Mr Richmond and stressed particularly the debt which was owed to the Ruler and Government of Kuwait and its people for creating the climate in which the oil industry could get on with the job, and gave credit also to the British and American Governments.

The Institute of Petroleum

The toast to the Institute was proposed by J. E. Akins, who said that although Mr Craig had lent him a volume on oil which he had studied, with other works, most diligently, he confessed himself still somewhat at a loss. He then proceeded to read from a U.S. Foreign Services Report. His satire and the sonnet which accompanied it were much appreciated by his listeners.

Sir Stephen Gibson replies

The reply to the toast was made by Sir Stephen Gibson, C.B.E., a past president of the Institute. He recalled that in 1943 he and the late Tom Patrick were appointed by their respective companies to design a plant for the Burgan Field for 25,000 bd, or if they thought the field would stand it, 50,000 bd. Greatly daring they had decided to design the plant for 50,000 brl. When he had visited Burgan that morning he had seen that the field was now producing 1·8 million bd.

As chairman of the IP Branches Committee it gave him very great pleasure to see the success of the Kuwait Branch—one of the most successful branches of the Institute. He emphasized the international scope of the Institute, pointing out that its membership of 4500 is drawn from 42 nationalities who lived in more than 70 different countries.

Early in the 1930's, said Sir Stephen, the Anglo-Persian Oil Co. noted that world production and consumption had been doubling approximately every 10 or 12 years since

J. Millas, Gulf Oil Corporation; *L. T. Jordan, C.B.E.*, assistant managing director Kuwait Oil Company; *and E. E. Dawson*, general manager Aminoil, *share a joke*

With Sir Stephen Gibson in this picture are J. D. Johnson and R. T. Anderson, both members of the Kuwait Oil Company

L. M. Craig enjoying a talk with Sir Stephen Gibson

1890, but did not believe that such a rate of growth could continue, but it has done so. In those days the world was producing some 150 million tons/year. In 1960 it would be over 1000 million tons, and there was no sign whatever of that doubling rate falling off. Consumption in the U.S.A. was still increasing. Since 1859 it had led the world in the use of petroleum, and since that time had produced a total of about 10,000 million tons. The rest of the world was, in many cases, following this lead. He said he thought that within the next 20 years the annual consumption of Western Europe (including Russia) per head of population, could equal that of the U.S.A. Indications were, he said, that production in Russia as a whole might equal that of the U.S.A. in years to come, and that China, which might well have reserves approximating to those of Russia, would also develop, but more slowly.

Returning to the subject of the Institute of Petroleum Sir Stephen pointed out that in pursuit of its objective of enabling knowledge of all aspects of the petroleum industry to be freely exchanged by open discussion the Institute was one of the great supporters of the World Petroleum Congress.

The Institute, he remarked, was finding some difficulty in living up to its aims but it was not a drawback, it showed that the Institute was very much alive. Some people believed that the papers did not have a sufficiently wide appeal. Nevertheless the success and rapid growth of two Groups, covering

H. D. Knight, Bahrain Petroleum Company; *E. Boaden, O.B.E.*, general manager Kuwait Oil Company; *and R. A. Lambourn*, Kuwait Oil Company

G. A. Lee, honorary secretary of the Kuwait Branch; *with A. J. Daniels*, Kuwait Oil Company; *and Said Omar and D. G. McGregor* of the Government of Kuwait

Exploration and Production, and Economics and Operations, together with the fact that in addition to the regular series of papers the Institute held various symposia, showed that progress was being made.

The Guests

In proposing the toast to the guests L. M. Craig, chairman of the Kuwait Branch, welcomed the three distinguished members of the Kuwait Government Service present, and also Sir Stephen Gibson, and Mr Akins (to whom, Mr Craig noted, it would presumably be necessary next year to send a volume on foreign affairs.)

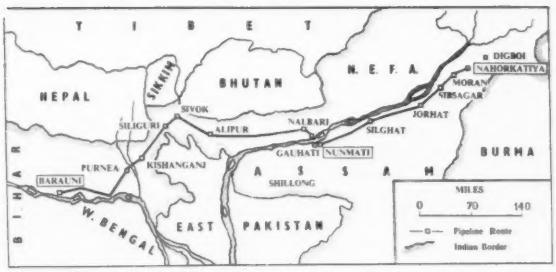
The Branch was also pleased to welcome John Millas, of Gulf Oil Corp; D. A. Campbell, of KOC in London; E. E. Dawson, of Aminoil; and Mr Simpson of BP. They were also pleased to have with them W. H. Cotter, H. D. Knight, and G. R. B. Hinton from the IP Bahrain Branch, and R. D. Romine and G. W. Stockwell of the A.I.M.E., Dhahran.

Mr Craig concluded by thanking KOC for making the dinner possible, and Messrs Porter, Blyth, and Lloyd for so wonderfully providing for them.

In his reply on behalf of the guests, D. A. Campbell gave some reminiscences of earlier years in Kuwait before thanking the Branch most sincerely for its hospitality.

D. A. Campbell, Kuwait Oil Company, *in conversation with Sir Stephen Gibson*

India's Largest Pipeline will be Remote Controlled



With three spreads working simultaneously in three different districts of Assam, India has embarked on the construction of the largest oil pipeline in the Far East.

The 720-mile line will carry highly viscous crude oil from the newly discovered fields of Oil India Private Ltd in the jungles of Upper Assam to the two Government refineries at Nunmati in Assam, and Barauni in Bihar. Burmah Oil Co. Ltd has a two-thirds holding in the £37½ million Oil India Private Ltd, and the Indian Government a one-third holding.

The pipeline will be constructed in two stages and State Governments have acquired a 40 ft–60 ft wide right of way along the route which passes through Assam, West Bengal, and Bihar. The first section, which will use about 32,900 tons of 16-in pipe, will run 260 miles from Nahorkatiya to Nunmati and should be complete by November 1961. The second stage of 460 miles from Nunmati to Barauni in Bihar will be a 14-in line using 51,000 tons of steel and is expected to be ready in the second half of 1962.

The first section will carry 2¾ million tons crude/year from the wells at Nahorkatiya and Moran but it will be possible to expand capacity to 4 million ton/year if required. The second stage will have an initial annual capacity of 2 million tons but design allows for a possible increase to 3¼ million tons/year.

The Burmah Oil Co. (Pipelines) Ltd will supervise the work on the British designed pipeline which is being constructed by Messrs Mannesmann of Düsseldorf and Saipem of the Italian ENI group, who have formed a joint company Mannesmann-Saipem Pipeline Contractors.

The 16-in pipe for the first stage was manufactured by Stewarts and Lloyds in the U.K. The 14-in pipe for the second stage is being supplied by Hindustan Steel from their Rourkela plant.

World tenders were invited for all major items for the pipeline, but where bids from Indian sources were competitive, they were given preference.

The line will cost £33 million, and it will be equipped with an extensive radio communications network, push-button controls for the remote operation of pumping stations, and telemetering services, to make it one of the most technically advanced crude oil transportation systems of its size in the world.

Eight pumping stations will be erected at about 90-mile intervals along the line and there will be an injection station at Moran. Repeater stations will also be installed to boost radio signals so that the pipeline headquarters at Gauhati will know conditions at every pumping station and will be able to operate them by remote control. In the event of an emergency, it will be possible to shut down the whole pumping system from the

The first lengths of pipe being laid in Upper Assam

Clearing the right of way at Nahorkatiya. A production derrick can be seen in the background

central headquarters or to close individual valves to isolate particular sections. Construction of pumping stations between Nahorkatiya and Nunmati is now in progress.

The widely varying terrain in the States of Assam, West Bengal, and Bihar, through which the line will pass, includes paddy fields, tea gardens, forests, hills, and swamps, and poses many construction problems. A specially constructed suspension bridge nearly a mile long and costing Rs. 1 crore, will take the pipeline across the Brahmaputra River. Seven other major rivers and 70 smaller rivers lie on the route, which at one stretch in the state of West Bengal passes close to the foothills of the Himalayas in Nepal.

A worker bevelling the ends of 16-in diameter pipe lengths

The pipes will be given cathodic protection and will be buried in a 4 ft deep ditch. They will be coated with plasticized coal tar bitumen, reinforced by an inner wrap of fibre-glass tissue. There will also be an outer protective wrap of fibre-glass impregnated with coal tar.

The entire project is expected to cost Rs. 44 crores, of which foreign capital will contribute about 43 per cent. Pipes will account for 22·8 per cent of the total cost, main line construction and demarcation 19 per cent, pumping and generating plants, conditioning plants, etc. 17 per cent, river crossing 8·2 per cent, and tele-communication/telemetering and cathodic protection 4·3 per cent.

The system will allow India's crude production capacity to be increased from 8500 bd to 65,000 bd.

★ ★ ★

TAPLINE'S FIRST DECADE OF OPERATIONS

Ten years have elapsed since the Trans-Arabian Pipe Line Co. (Tapline) loaded the first tanker with crude oil from Saudi Arabia on 2 December 1950. In the following decade the Company has transported approximately 1160 million brl of crude, loaded approximately 8190 tankers.

Tapline, operating the 30-31-in line extending 754 miles from Qaisumah, Saudi Arabia, to its Mediterranean terminal at Sidon, Lebanon, has succeeded in greatly reducing costs in its struggle to remain competitive with ever-larger and lower-cost tankers carrying crude from Ras Tanura, Saudi Arabia, westward via the Suez Canal. The Company estimates that it could transport a barrel of oil and load it aboard a tanker for 24 per cent less than it could 10 years ago, if its line were operating at present capacity of 470,000 bd.

During this period, the pipeline's capacity has been increased almost 60 per cent with an additional investment of only about 12 per cent of the original. In 1951, the average turn-around time of a tanker at Sidon was 33 hours. To-day it is about 14 hours.

The average barrels per ship loaded at Sidon have increased from 118,533 brl for 1951 to approximately 207,000 brl in 1960. Over the same years the average number of ships loaded per day has decreased from 2·52 to 1·13 ships.

Progress in the pipeline's construction has continued since 1951 as applications were made of the advanced theory of combined stress to raise operating pressures to the highest in the industry.

Of the Company's present 1100 employees, 89 per cent are Arab nationals.

Tapline also delivers about 12,500 barrels of oil daily to the Mediterranean Refining Company (Medreco) at Sidon. In September 1960, the Company began deliveries of crude to the Jordan Government for use in its refinery at Zarqa, north of Amman, at the prospective rate of about 5000 bd.

TAPLINE OPERATIONS 1950–1960

Year	*Sidon receipts*	*Deliveries to ships*	*Av. brl. per ship*	*Deliveries to Medreco*	*Deliveries to Jordan*	*Total Deliveries*
1950	5,800,026	3,625,280	—	—	—	3,625,280
1951	107,503,904	109,050,479	118,533	—	—	109,050,479
1952	114,536,152	113,194,315	114,107	—	—	113,194,315
1953	112,226,020	113,581,506	122,658	—	181	113,581,683
1954	116,197,282	116,370,471	129,588	—	80,097	116,450,568
1955	117,574,250	113,745,456	134,929	2,754,538	86,016	116,586,010
1956	120,133,494	117,422,140	141,986	3,630,605	91,735	121,144,480
1957	126,912,900	121,238,391	140,648	4,092,906	101,919	125,433,216
1958	134,287,438	130,791,632	156,637	3,546,279	113,397	134,451,308
1959	123,364,456	119,126,981	173,908	4,131,888	188,066	123,376,935
1960 (Through Nov.)	82,242,000	78,233,000	206,966	4,172,000	459,000	82,864,000
Totals	1,160,777,922	1,136,379,651	138,735	22,328,216	1,050,411	1,159,758,278

Note: Figures for November 1960, are estimated.

New Research Laboratory for London Transport

London Transport's new research laboratory at Chiswick, was officially inaugurated by the chairman, A. B. B. Valentine, on 5 December. It has enabled the scientific staff of the research department to be brought together under one roof for the first time and it will be the centre for the scientific control and investigation of materials and equipment used throughout London Transport's road and rail services.

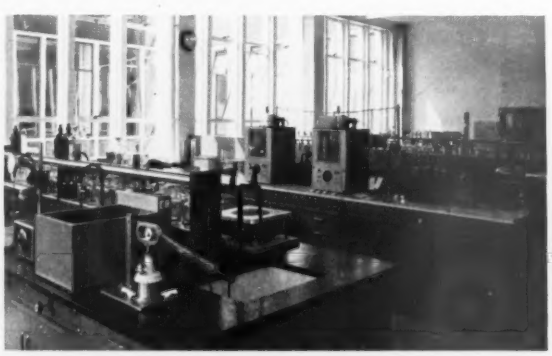
London Transport spends more than £15 million a year on stores and materials, and an important part of the work of the research department is to carry out regular routine investigations of these supplies. It is also responsible for the technical control of certain works processes.

There has been a laboratory at Chiswick Works since 1921, but its scope was originally limited, in the main, to chemistry. Improved accommodation was made available in 1931, but soon became inadequate as other departments made increasing use of the facilities it offered. The full development of the laboratory's services has been hindered by the lack of adequate accommodation. Before the new building was occupied, the laboratory was housed in portions of four scattered buildings and three temporary huts on the Chiswick Works estate. The new laboratory, with an adjacent single-storey annexe, will accommodate a staff of about 80, of all grades.

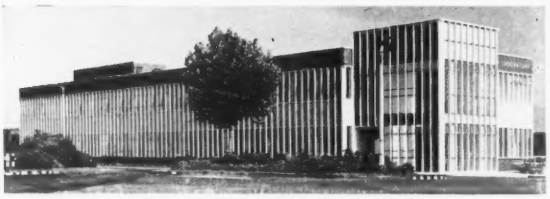
Much of the work is of a non-repetitive character but there are also many continuous activities.

Perhaps the largest group of activities consists of the *ad hoc* investigation of day-to-day problems, but longer term investigations in the nature of technical research are also undertaken in, for example, the field of lubrication. In planning the new laboratory, the aim has been particularly to promote the further development of this aspect of the work.

Apart from various ancillary activities, the work of the Research Laboratory is divided between five sections and one sub-section. These are briefly reviewed as follows.



The fuels and lubricants laboratory showing a hand-operated grease-worker and penetrometer in foreground and viscometry equipment in the centre



A general view of the laboratory

Physics and Engineering Section

This section is concerned with measurements of the mechanical and electrical properties of many types of non-metallic materials; with the development and application of non-destructive test methods of examination of engineering components; and with investigations into the behaviour of items of equipment under conditions in service and under controlled laboratory conditions respectively.

Typical of materials regularly tested for compliance with specification are rubber and plastics, safety glass, paper, cork tiles, and electric insulating materials. Facilities for photometric testing of electric lamps have been augmented by additional life test racks capable of operation at any desired voltage from a regulated source of supply.

The experience gained with a small cold chamber has demonstrated a considerable demand for this facility, and the opportunity has been taken to install a larger cold chamber in the new laboratory. The temperature within the room can be maintained at any desired level down to about 0° F, and the chamber is likely to prove particularly valuable in connexion with cold weather problems and the operation of compressed air equipment, water cooling and heating systems, and ice formation on conductor rails.

The section undertakes on behalf of the laboratory as a whole the design and construction of any special items of equipment which may be needed and also makes calibration checks of electrical instruments, pyrometers, etc., on behalf of other departments.

The section is often asked to provide instrumentation required by the engineering departments for a variety of investigations, typical of which is the work which has been undertaken in connexion with axle stresses. Information obtained from experiments on an Underground car provide a basis for the test programme to be undertaken on the axle fatigue test machine installed in the Engineering Laboratory.

"Shell" automatic oil oxidation apparatus

Metallurgical Section

This section is responsible for investigations concerned

Grease penetrometer with automatic timer for determining consistency of lubricating greases

with all classes of ferrous and non-ferrous metals used by London Transport. It is concerned with matters such as the recommendation of appropriate materials for particular components; advice on avoidance of design features likely to lead to fatigue fracture during service; examination of failed components and recommendations for changes in design or material to avoid further failures; and technical assistance and advice on various workshop processes.

Many of the specimens handled are of relatively massive size and the services of a machine shop are available which may also be utilized in the construction of special laboratory test rigs and apparatus needed by the laboratory as a whole.

The section includes a chemical laboratory devoted to metal analysis and related work such as the control of electroplating solutions. Because of the wide variety of metals encountered, classical methods of chemical analysis continue to be used to a considerable extent but the improved accommodation now available will facilitate investigation of the potentialities of physical methods of analysis with a view to their adoption where advantages can be established. To this end a separate small laboratory has been provided for spectrophotometric work, etc.

A group of three small inter-communicating rooms provides for metallurgical work, and houses a mounting press, equipment for preliminary polishing of microsections and micro-etching, polishing, and various microscopes.

The mechanical testing laboratory is equipped with 12½- and 30-ton tensile testing machines, an Izod impact tester, a Vickers hardness testing machine, and a power-operated Brinell hardness tester. A Hounsfield Tensometer is also used.

The move to new premises has now made possible the provision of equipment for radiographic examination of metals, which comprise a suitably-screened room housing a 260-kV X-ray tank unit, the controls of which are located in an adjacent control room. The equipment is of a portable type to enable X-ray examinations to be undertaken on site. The room can also be used for gamma radiography, and a suitable well has been provided within the room for housing a radioactive source. The radiographic equipment will be of particular value for the inspection of welded and cast components and will also facilitate the periodic examination of welder's test specimens which the laboratory is called upon to undertake.

A further innovation is the provision of equipment for heat treatment trials and welding tests.

Thermostatically-controlled bath and viscometers

Fuels and Lubricants Section

The section is concerned with liquid fuels, lubricants of all types, transformer oils, and various other allied petroleum-based products.

On the fuels side, the main accent is on fuel for diesel-engined buses. With regard to lubricants, the range of applications is very extensive, from heavy items of plant to clocks and other delicate mechanisms. The range of lubricants handled is correspondingly wide, embracing plain and additive-treated oils, numerous categories of grease, and products incorporating solid lubricants. Bonded lubricant coatings, special surface treatments designed to reduce friction, and "self-lubricating" materials are also covered.

The functions of the section may be briefly summarized as follows:—

(1) Provision of technical advice in relation to the purchase of the commodities covered.
(2) Maintenance of a check on the quality of supplies.
(3) Provision of an advisory service in respect of (i) appropriate grades of material for use in specific application, (ii) methods of use, etc.
(4) Investigation of day-to-day problems arising in connexion with the use of the materials.
(5) Keeping under constant review developments in the field of fuels and lubricants, and investigating those which are of potential interest to London Transport.
(6) Conduct of long-term investigations having the object of increasing efficiency by (i) use of improved materials and (ii) adoption of modified practices. In this the laboratory work is frequently supplemented by trials made under actual service conditions.

The equipment includes the normal basic physical examination apparatus. In the viscometry installation is compact viscometer-washing equipment constructed in the laboratory workshop. There is a Petter AV1 engine and associated ignition delay meter for determination of the cetane number of diesel fuels. High voltage test equipment is available in the Physics and Engineering Section of the Laboratory for the determination of the electric strength of insulating oils.

Potentiometric titration of used lubricating oil showing titration equipment and pH meter

There are parallel facilities for carrying out the usual chemical examinations of new and used petroleum products, and instrumental aids include a flame photometer, spectrophotometers, and electrometric titration apparatus. The substantial numbers of used oil samples examined in the laboratories include a high proportion of crankcase oils, and for determination of suspended solids there is special equipment for subjecting the used oils to filtration through "Sterimat" filter pads.

The oxidation resistance of lubricating oils is constantly under study, and in equipping the new laboratories opportunity has been taken to improve the oxidation test facilities already available in the form of Air Ministry and Michie equipments by the acquisition of a Shell "Procedure B" automatic oil oxidation apparatus. Important amongst the many applications in which oxidation tests are employed is the evaluation of oxidation-inhibited gear oils used in road vehicles.

The work involves a substantial interest in the mechanical performance of lubricating oils and greases, and the testing equipment includes a Shell four-ball machine, a mechanical greaseworker, a rolling stability tester, and a CRC wheel bearing rig.

Equipment for the study of the use of derv fuel includes a machine for testing fuel injection pumps. Extensive use is made of portable apparatus for exhaust gas analysis, and smokemeters of both Hartridge-B.P. and Von Brand types are available for checking the intensity of exhaust smoke emission.

Chemistry in the Research Laboratory

Work of a chemical nature is carried out within all but one of the five sections. A large volume of chemical work, however, falls outside the scope of such specialized sections, and is dealt with by the General Chemistry Section. In the new premises, two adjoining chemical laboratories have been provided for this work.

The salient feature of the work of this section is its wide variety. Chemical analysis of virtually any type of material may be involved, as well as investigations into the most diverse problems.

Two further small chemical laboratories have been provided for special investigations. One, where the aim has been to achieve flexibility, at present is devoted to the application of ultra-violet spectrophotometry to Laboratory problems. The other has been designed for work demanding particularly careful handling of materials or the estimation of trace quantities.

Textiles Sub-Section

This sub-Section maintains close control over the quality of supplies of various clothing and fabrics. New developments in textiles, particularly in the field of man-made fibres, are kept constantly under review, and considerable experimental work is carried out in order to establish the value of such developments.

Paints Section

This Section is concerned with paints used on both road and rail vehicles, and on buildings, structures, etc. Methods of application, and the necessary preparatory processes, are studied as well as the materials themselves. In addition the Section deals with a number of miscellaneous items including metal pretreatment solutions, wood preservatives, panel fillers, paint strippers, masking pastes, transfers, and silk screen inks.

The Physical Testing Laboratory is equipped with a high-speed centrifuge and a range of standard instruments including photo-electric apparatus for measurement of gloss and opacity, a power-operated scratch hardness tester, thickness gauges, an apparatus for measuring drying time, and apparatus for testing flexibility, chip resistance, etc. The General Application Laboratory houses equipment for the assessment of application properties, a mechanical paint visual colour matching, and various applicators for producing paint films of predetermined thickness.

An accelerated weathering machine, has four carbon arc lamps and various water jets for simulating rain and controlling panel temperature, whilst other equipment includes a salt spray cabinet and a humidity chamber for corrosion testing.

The new Research Laboratory has been designed to the requirements of A. T. Wilford, A.R.C.S., B.Sc., F.R.I.C., F.S.S., C.I.Mech.E., F.Inst.Pet., director of Research, London Transport, by Messrs Adie, Button and Partners, architects, in association with London Transport architects.

The site of the Laboratory, which is on two floors covering an area of 27,000 sq ft, is part of the London Transport Executive Chiswick works estate. Main contractors were Holland & Hannen and Cubitts (Great Britain) Ltd.

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MIDDLE EAST OIL PRODUCTION

	December	*Jan-Dec*
	Tons	
Iraq Petroleum Co. Ltd ...	3,036,563	33,841,608
Basrah Petroleum Co. Ltd ...	904,972	11,396,379
Mosul Petroleum Co. Ltd ...	104,399	1,296,411
Qatar Petroleum Co. Ltd ...	684,410	8,083,032
Iraanse Aardolie Exploratie en Productie Mij	4,757,000	50,991,000
	Barrels	
Arabian American Oil Co. ...	43,152,428	456,453,173
Bahrain Petroleum Co. Ltd ...	1,399,458	16,500,424
Getty Oil Co. and American Independent Oil Co. (Kuwait-Saudi Arabia Neutral Zone)	4,846,598	49,830,194

The refinery throughput at Abadan of the Iraanse Aardolie Raffinage Mij for December was 1,384,000 tons, the total for 1 January to 31 December being 16,997,000 tons.

Crude processed at Aramco's Ras Tanura refinery during December was 7,822,043 brl, the total for 1 January to 31 December being 82,311,386 brl.

Kuwait Oil Co. Ltd. production during the fourth quarter of 1960 averaged 224,477 tons/day. The total production during 1960 was 80,573,627 tons.

IP GENERAL MEETINGS

Proposed Change in Time of Commencement

It has been suggested that the time of commencement of IP General Meetings should be changed to 4.30 p.m. (tea at 4 p.m.) from the present time of 5.30 p.m. (tea at 5 p.m.), or alternatively, to a later hour.

Members of the Institute are asked to assist the Publications Committee in this matter by expressing a preference for the time which they consider most suitable. Replies, preferably on a postcard, should be sent to the Editor to arrive before the end of June.

The Ownership of World Oil Production

Of the 1,012,133,000 tons of crude oil and natural gas liquids produced in the world during 1959, over 17 per cent came from British or British/Dutch interests. Output by such interests totalled 172·5 million tons compared with nearly 623 million tons produced by U.S. companies and the 216·7 million tons of other interests. The percentage share of U.S. and "others" was 61·5 and 21·4 respectively. Compared with the output in 1958 the British and British/Dutch share, and the share of other interests, has increased slightly whilst that of U.S. companies had declined. This trend has been in evidence over several recent years. These are the salient points in an interesting recent estimate by the Petroleum Information Bureau, which shows that for the first time in one year world production of liquid hydrocarbons was over 1000 million tons.

Output in North America rose to over 406 million tons during 1959, of which 5 per cent emanated from British or British/Dutch companies. In Canada, although total production rose by nearly 13 per cent over that of 1958, the share of "other interests"—mainly Canadian—increased by as much as 22 per cent, and is fast approaching the figure for American-owned production in that country.

Middle East production, which totalled more than 231 million tons in 1959, came 55 per cent from U.S. producing interests, whilst British or British/Dutch companies were responsible for 36 per cent. The emergent oil continent of Africa more than doubled its petroleum output in 1959 com-

WORLD OIL PRODUCTION OWNERSHIP*

(thousand metric tons)

Country	1959				1950			
	British and British/Dutch	*U.S.A.*	*Other*	*Total*	*British and British/Dutch*	*U.S.A.*	*Other*	*Total*
WESTERN EUROPE:								
Western Germany	379	1,196	3,527	5,102	60	180	880	1,120
Austria	67	67	2,326	2,460	—	—	1,600	1,600
France	16	1,232	530	1,778	—	—	130	130
Netherlands	880	880	—	1,760	350	350	—	700
Italy (including Sicily)	—	1,391	364	1,755	—	—	10	10
Yugoslavia	—	—	590	590	—	—	110	110
United Kingdom	84	—	—	84	50	—	—	50
TOTAL	1,426	4,766	7,337	13,529	460	530	2,730	3,720
MIDDLE EAST:								
Kuwait	34,765	34,765	—	69,530	8,645	8,645	—	17,290
Saudi Arabia	—	54,160	—	54,160	—	26,620	—	26,620
Persia	24,520	18,160	2,980	45,660	32,260	—	—	32,260
Iraq	19,750	9,875	12,125	41,750	3,360	1,490	1,800	6,650
Qatar	3,800	1,900	2,290	7,990	780	390	470	1,640
Neutral Zone	—	6,190	—	6,190	—	—	—	—
Egypt (a)	721	283	2,154	3,158	1,780	590	—	2,370
Bahrain	—	2,246	—	2,246	—	1,510	—	1,510
Turkey	—	—	370	370	—	—	20	20
Israel	—	—	126	126	—	—	—	—
TOTAL	83,556	127,579	20,045	231,180	46,825	39,245	2,290	88,360
AFRICA:								
Algeria (including Sahara)	—	—	1,383	1,383	—	—	5	5
French Equatorial Africa	—	—	755	755	—	—	—	—
Nigeria	570	—	—	570	—	—	—	—
Morocco	—	—	95	95	—	—	45	45
Angola	—	—	50	50	—	—	—	—
TOTAL	570	—	2,283	2,853	—	—	50	50
NORTH AMERICA:								
U.S.A.	19,210	360,740	870	380,820	12,000	273,000	—	285,200
Canada	1,075	12,575	11,580	25,230	† —	2,330	1,550	3,880
TOTAL	20,285	373,315	12,450	406,050	12,000	275,530	1,550	289,080
LATIN AMERICA:								
Venezuela	47,846	95,713	—	143,559	25,100	52,390	650	78,140
Mexico	—	—	14,770	14,770	—	—	10,490	10,490

pared to the previous year, and the producing interests responsible were almost entirely French. U.S. producing interests were not represented although this situation will be altered when Libya commences large-scale production during 1961.

The vast bulk of the world's output which is under the heading of "other interests" came from the Soviet bloc, whose estimated aggregate of some 147 million tons in 1959 was 14 per cent of the world total.

It is of particular interest to compare such statistics with those for 1950, the first year for which the Bureau compiled such a table. In that year world crude oil and natural gas liquids production totalled 538,335,000 tons, and the aforementioned recent growth in the share of "other interests" is highlighted by the fact that in 1950 their share of the total was 11·5 per cent—only just over half of what it was nine years later. The proportion of British and British/Dutch production, at 18·3 per cent has declined slightly and that of U.S. companies by a greater margin, in the intervening period.

Total world output has virtually doubled since 1950. The Middle East's output has almost trebled, that of Western Europe has risen by nearly four times, and a doubling has been seen in Far Eastern production.

Changes that have occurred in the relative shares of the various interests in certain areas since 1950 are particularly evident in the Middle East. In the earlier year the British and British/Dutch contribution was 52 per cent compared with the U.S.A.'s 44 per cent. American companies' increased production in Indonesia has also changed the relative proportional interests in the Far East over the nine years. A detailed picture of the ownership of world production in both 1959 and 1950 can be seen in the accompanying table.

WORLD OIL PRODUCTION OWNERSHIP—*continued*

(thousand metric tons)

Country	1959				1950			
	British and British/ Dutch	*U.S.A.*	*Other*	*Total*	*British and British/ Dutch*	*U.S.A.*	*Other*	*Total*
LATIN AMERICA—*continued:*								
Colombia	1,930	4,365	1,425	7,720	1,570	3,280	—	4,850
Argentina	394	21	5,976	6,391	490	375	2,595	3,460
Trinidad	3,000	2,950	—	5,950	2,910	35	35	2,980
Brazil	—	—	3,230	3,230	—	—	50	50
Peru	515	1,765	145	2,425	410	1,620	20	2,050
Chile	—	—	897	897	—	—	80	80
Bolivia	—	—	390	390	—	—	90	90
Ecuador	340	45	—	385	340	—	—	340
Cuba	—	—	30	30	—	—	20	20
TOTAL	54,025	104,859	26,863	185,747	30,820	57,700	14,030	102,550
FAR EAST:								
Indonesia	5,848	12,272	446	18,566	3,650	2,800	—	6,450
British Borneo	5,495	—	—	5,495	4,240	—	—	4,240
Burma	460	—	50	510	70	—	—	70
India	442	—	—	442	255	—	—	255
Japan	—	—	400	400	—	—	310	310
Pakistan	321	—	—	321	170	—	—	170
New Guinea	100	150	—	250	90	160	—	250
TOTAL	12,666	12,422	896	25,984	8,475	2,960	310	11,745
U.S.S.R. BLOC:								
U.S.S.R.	—	—	129,500	129,500	—	—	37,500	37,500
Rumania	—	—	11,440	11,440	—	—	4,100	4,100
China (b)	—	—	3,700	3,700	—	—	120	120
Hungary	—	—	1,050	1,050	—	—	500	500
Albania	—	—	480	480	—	—	350	350
Bulgaria	—	—	280	280	—	—	—	—
Poland	—	—	170	170	—	—	180	180
Czechoslovakia	—	—	170	170	—	—	80	80
TOTAL	—	—	146,790	146,790	—	—	42,830	42,830
WORLD TOTAL	172,528	622,941	216,664	1,012,133	98,580	375,965	63,790	538,335
	(17·1%)	(61·5%)	(21·4%)	(100%)	(18·3%)	(69·8%)	(11·9%)	(100%)

* Natural gas liquids included.

† Negligible.

(a) Anglo-Egyptian Oilfields Ltd's properties were desequestrated around mid-1959.

(b) Including crude oil from shale and coal.

Personal Notes

G. B. Huiskamp, finance co-ordinator of the Royal Dutch-Shell Group, has been appointed a director of Shell International Petroleum Company Ltd.

G. B. Huiskamp

He studied economics at the Municipal University of Amsterdam, and after working for several years in banking he joined NV De Bataafsche Petroleum Mij in 1945. The following year he became head of the Financial Department, and in 1948 he was appointed general attorney of BPM. In 1952, he was seconded to the Shell Petroleum Company Ltd in London, where in 1953 he was appointed treasurer of the Finance Administration. In 1955 he returned to the Hague, becoming co-ordinator of the Finance Administration BPM. In 1958 Mr Huiskamp was appointed assistant managing director of the Royal Dutch Petroleum Company.

The appointment of **J. Ronald Getty** as president and general manager of Veedol International has been announced by Tidewater Oil Company.

Mr Getty will also direct Tidewater's export operations in Europe, Africa, and the Middle East. Central offices for Veedol International are to be established in Switzerland. Mr Getty has been Tidewater's marketing manager and a member of the Company's board of directors since 1957, and has served as managing director of Veedol GmbH since 1955.

A graduate of the University of Southern California, he did advanced study in economics and marketing at the University of Heidelberg and the University of Zurich. He joined Tidewater in 1955 as a European sales representative.

J. R. Payne has been elected a director of Esso Petroleum Co. (Ireland) Ltd and Cleveland Petroleum Co. Ltd. He was formerly manager of the Midland Division of Esso Petroleum Co. Ltd, a post he had occupied since 1950.

J. R. Payne

Mr Payne, who is an engineer by profession, joined Anglo American Oil Co., as Esso was then known, in 1927.

G. G. Usmar, formerly sales manager of Esso's Scottish Division, has been appointed manager of the Company's Midland Division in succession to Mr Payne.

R. J. Pinder, C.B.E., M.Inst.Pet., a managing director of Esso Petroleum Co. Ltd, retired recently.

Mr Pinder joined Esso as a clerk in 1920. He became deputy general sales manager in 1950 and general sales manager the following year. In 1953 he was appointed to the board with special responsibilities for the Company's marketing activities and in 1956 he became a managing director.

N. P. Biggs, who has been a director of Cleveland Petroleum Co. Ltd since 1956, has been appointed chairman following the retirement of **R. J. Pinder,** M.Inst. Pet.

N. P. Biggs

Recent appointments announced by Shell-Mex and B.P. Ltd include:

J. R. L. Moore, D.S.C., as manager, Ships' Management Department, which has taken over the management of the Company's fleet of coastal tankers and other craft from the former Supplies and Transportation Department.

J. R. V. Brown is now manager, Staff Administration Department, and **M. M. Hawes**, B.A. (Oxon), manager, Staff Development Department, both of which have been formed from the former Staff Department.

D. H. F. Joyce has become manager of the newly-formed Supplies and Distribution Department which is now responsible for the transportation, storage, and distribution of the Company's products.

George Richardson, B.Sc., A.R.S.M., M.Inst.Pet., is now manager, Industrial Fuels Department, which has been formed from the Fuel Oil Department and the Company's subsidiary, Shell-Mex and B.P. Gases Ltd. He is a Member of the Council of the Institute of Fuel.

E. F. Westray has become manager of the Agricultural Department, created to foster and expand the sales of petroleum products in the agricultural market.

A. V. Driver, B.Sc. (Eng.) Lond., A.M.I.Mech.E., M.Inst. F., A.F.Inst.Pet., manager of the new Domestic Fuels Department, formed to deal with marketing of fuels for domestic central heating.

M. E. Weinstein, B.Sc. (Econ.), F.R.S.S., M.Inst.Pet., became manager of the Trade Relations Department while retaining the appointment of chief economist.

A well-known figure at almost every type of motor and motor-cycling circuit event for many years, **A. E. Perkins,** completed 40 years service with Mobil Oil Company recently when he was entertained to lunch at the Park Lane Hotel by board members and colleagues. Mr Perkins is at present manager of the section responsible for the Company's racing activities.

J. C. Gridley, chairman of Mobil Oil Company presenting A. E. Perkins with his gold watch

With the retirement of J. M. Cooper, assistant managing director of Kuwait Oil Company Ltd, **E. C. Masterson** B.Sc., F.Inst.Pet., will take over Mr Cooper's responsibilities in London, being designated general manager, London.

E. C. Masterson

His first appointment in the oil industry was with the Phoenix Oil and Transport Company's Rumanian subsidiary, Unirea SAR, and he worked in various oilfields in Rumania until 1927. In that year he went to the United States, where he formed and headed the Phoenix company's American subsidiary. After two years in the U.S.A. he returned to Rumania and was appointed general manager of Unirea SAR in 1935.

In 1944 he was selected as a member of the British Military Mission to Rumania and was appointed head of the Oil Section. In 1946 he entered the London office of Phoenix Oil and Transport Company where he remained until he joined the Kuwait Oil Company in 1948. At KOC Mr Masterson's first appointment was that of technical assistant to C. A. P. Southwell (now Sir Philip Southwell) who was managing director. When, in 1950, the Oil Department was formed, Mr Masterson was chosen to head it. In 1956 he was appointed general manager of the Oil Operations Group.

He served as a member of Council of the IP from 1952 to 1959.

Following the merging of the two companies, the marketing organizations of Lobitos Oilfields Ltd and Manchester Oil Refinery (Holdings) Ltd have been modified with effect from 1 January 1961.

H. E. Brown, M.Inst.Pet., of Lobitos Oilfields, and **S. R. Jarvie** of MOR will jointly co-ordinate all marketing policy relating to the outputs of the respective U.K. refineries.

R. W. McFadyen, M.Inst.Pet., has been appointed wholesale sales manager of Lobitos Oilfields.

MOR's marketing organization has been divided into wholesale and retail: the former is the responsibility of **J. E. Harvey,** M.P., A.M.Inst.Pet., and the latter the responsibility of **P. C. Masters,** A.M.Inst.Pet.

G. H. Thornley, M.Sc., F.Inst.Pet., group technical manager, Castrol Group of Companies and a director of Castrol Industrial Ltd, has been appointed to the newly-formed Divisional Committee No 1 (Insulating Materials) of the Electrical Research Association.

L. Denison

Laurie Denison has joined the staff of the Castrol Group and is being assigned to the Group's associate company in Brazil, Castrol (Lubrificantes) S.A., as technical consultant on industrial oils. He was previously chief service engineer, Tooling Division of Weatherly Oilgear Ltd of Biggleswade.

We record, with regret, the death of **Sir Kenneth Brand Harper,** a former chairman of The Burmah Oil Company Ltd.

Sir Kenneth, who joined Burmah Oil in 1913, became a director of The Burmah Oil Company Ltd in 1937, and was appointed chairman and managing director in 1948. He resigned as managing director in 1951, but remained as chairman until November 1957 when he retired. Sir Kenneth, who was knighted in 1936, leaves a widow and three children.

Sir K. B. Harper

Sir Percy Hunting, F.I.C.S., M.Inst. Pet., chairman of the Hunting Group of Companies, has retired, and is succeeded by his brother **G. L. Hunting,** M.Inst.Pet., the present vice-chairman. Sir Percy's son, **C. P. M. Hunting,** T.D., A.C.A., M.Inst.Pet., becomes vice-chairman.

D. W. Harris

Georges de Henau has been appointed executive sales engineer to Badger NV at their head office in The Hague.

Maynard P. Venema becomes chairman and chief executive officer of Universal Oil Products Company in succession to **David W. Harris.** Mr Harris will continue to serve as a member of the board of directors and will be chairman of its Finance Committee.

Mr Venema has spent more than 25 years with UOP in capacities ranging from chemical engineer to manager of the company's Patent Department to president and a director. He will continue as president of the company.

M. P. Venema

D. J. Heslop, A.M.I.Mech.E., F.Inst.F., F.Inst.Pet., retired recently from the post of deputy area engineer at NIFES, and has taken up an appointment with the chief mechanical and electrical engineer of the Directorate-General of Works, War Office, Chessington, dealing particularly with the oil firing of boilers.

The American Independent Oil Company has announced the election of **Paul E. Owens** as vice-president-marketing. Mr Owens is 42 and prior to joining American Independent in December 1959 as general sales manager, was assistant manager, Western Hemisphere, crude oil department for the Gulf Oil Company.

Arthur W. McKinney is retiring after more than 40 years service with the National Supply Co., although he will continue as consultant to, and member of the board of directors of Armco Steel Corp.

Mr. McKinney joined the National Supply Co. in 1920 and was appointed president in 1954.

Notes of the Month

BP Agreement with Texan Independent

BP Exploration Company (Libya) Ltd has acquired a 50 per cent interest in Concession 65 granted to Nelson Bunker Hunt, the Texas independent oil producer, in 1957. The concession covers nearly 33,000 sq km in southern Cyrenaica.

By these arrangements BP undertakes responsibility for locating and drilling certain test wells in the concession and for joint development of any discoveries made. This assignment was approved by the Libyan Government in consideration of BP's surrender of depletion allowance in respect of its own 50 per cent interest and an active programme of work involving the drilling of six wells. The first of these has already been spudded-in and is expected to reach at least 10,000 feet.

Oil Found at Pazanun Gas Field

Iranian Oil Exploration & Producing Company announces that some oil has been found for the first time in the Pazanun field, which lies on the pipeline route from Gachsaran to Bandar Mashur and where previously only gas had been found. The new well, No 5A, entered the oil productive Asmari Limestone at 9080 ft; deepening of this well and possibly the drilling of another well in the vicinity will be necessary to determine whether oil exists in sufficient quantities for commercial exploitation.

The Company has for some time been carrying out exploratory work to determine whether oil exists in commercial quantities in this field. Well No 5A is the second well drilled for this purpose; drilling of the first well, No 5, was discontinued for mechanical reasons.

The Company also announces that preparations are being made to drill the exploration well Lavan No 1 on Sheik Shuaib Island on the Straits of Hormuz on completion of Suru No 1 at Bandar Abbas, which has reached a record depth for Iran of 14,895 ft, and another at Bibi Hakimeh about 30 miles south of Gachsaran.

New Discovery Well in Cyrenaica

Esso Sirte, Inc., has begun controlled production testing of Raguba-1 discovery well in the Cyrenaica province of Libya about 80 miles from the Mediterranean coast.

The well has a 220-ft gas and oil bearing section below a depth of 5280 ft. Initial test data obtained from the 40-ft perforated section, 5440–5480, resulted in production rates of 494 bd of 40·5° API oil through a ¼-in choke, and 2250 bd through a ½-in choke. It is thought that production rates can be increased to 5000 bd by opening an additional section and by acidization. Two more wells are being drilled to determine the area of the field.

In January 1960, Esso Sirte acquired from Libyan American Oil and W. R. Grace and Co., an undivided half interest in two concessions in the Tripolitania province of Libya, and one in Cyrenaica province. Libyan American Oil is a wholly-owned subsidiary of Texas Gulf Producing Company.

Standard Oil Company (New Jersey) has another wholly-owned affiliate in Libya, Esso Standard (Libya) Inc, which made the Zelten field discovery, also in Cyrenaica province.

Exploration in North and West Africa

Société Saharienne de Récherches Pétrolieres, in which the BP Group has a 50 per cent interest, has started to drill a test well in south-east Algeria. Named Amasralad No 1, the well is in the direction of the Libyan frontier. Elsewhere in Algeria two seismic parties are operating for SSRP in the Hassi-Menkel permit area, one of them using the weight-dropping technique.

In all, Société des Pétroles de Valence (for whom SSRP is operating) holds exploration permits for six areas totalling some 30,000 sq km in Algeria. The BP Group holds interests ranging between 38 and 50 per cent in these permits.

In northern Senegal Société des Pétroles du Senegal, in which the BP Group also has a half interest, completed Nema Ding F-1 test well in October. The rig has now been moved by water to a new site on the western-most tip of Senegal where the Soloum delta meets the Atlantic.

Due south of this, in Gambia, near Bathurst, well Sara Kunda-1 is being drilled with a deep outfit by BP–BRP Exploration Co. (Gambia) Ltd.

Iran's Oil Exports in 1960

During 1960, it is reported that a total of 47,486,000 long tons of crude oil and refined products were exported from Iran. This is 13·7 per cent higher than the 41,767,000 tons exported in 1959. Of the total exports, 32,857,000 tons of crude oil were exported and 14,629 tons were delivered to Abadan for export as refined products.

Abadan Refinery Modernization

More than £750,000 is to be spent on modernization and overhaul of the crude distillation units in the Benches area of the Abadan refinery. Work commenced on the project in mid-December last and it is expected to be completed by this March. This is one of the largest overhaul–modernization projects to be undertaken at Abadan since the catalytic cracking modifications were completed at the end of 1959.

Oil Companies to Share in Queensland Concession

Subject to the approval of the Queensland Government, Cordillera Mining Co. is to assign its 6-million acre oil and gas concession in the State of Queensland, Australia, to subsidiaries of Continental Oil Co., The Ohio Oil Co., and Amerada Petroleum Corp.

Cordillera will receive a cash payment from each of the companies as reimbursement for acquisition costs and exploration expenditures incurred to date. Cordillera will retain a 25 per cent working interest which will be convertible at its option into a net profits interest of 7½ per cent, and will be carried by the oil companies in an exploration programme to be conducted by them.

Government approval will give the oil companies exclusive oil and gas exploration rights within the concession area for a period of 10 years. Should exploration result in a discovery of oil or gas, the government will lease a 100-sq mile area around the discovery to the oil companies and a 10 per cent production royalty will be payable.

Second Pemex Financing Agreement

British Oil Equipment Credits Ltd (a subsidiary of the Council of British Manufacturers of Petroleum Equipment) has entered into and ratified a second Financing Agreement with Petroleos Mexicanos. The value of purchases to be made in Great Britain from Members of the Council who wish to participate is again £3,500,000, and will be for refinery equipment.

Formation of Algerian Refinery Company

A further stage in the development of oil supplies from the French Sahara is the announcement of the formation of the company for the construction of the proposed refinery at Maison Carrée, near Algiers.

The capital of the company, Societé de la Raffinerie d'Alger, will be held by Cie Française des Pétroles 20 per cent, Cie Française de Raffinage (which is itself owned 56 per cent by CFP) 12 per cent, Soc. Shell d'Algerie and Esso some 18 per cent each, and about 10 per cent each by Soc. des Pétroles BP and SN Repal (half-owners of the Hassi-Messaoud production). Mobil Oil Française and Beryl Algerie will hold the remainder with 6 per cent each.

The refinery will have a crude capacity of 2·5 million tons/year and will be of a "simple" design comprising an atmospheric distillation unit and a catalytic reformer to process Hassi Messaoud crude and Hassi R'Mel condensate for the main product requirements of the growing Algerian market. Estimated cost of the refinery is approximately £17 million and completion is scheduled for early in 1963.

Strasbourg Refinery Company Formed

The refinery planned for installation at Herrlisheim, some 15 miles north of Strasbourg, will be built by a newly-formed company Soc. de la Raffinerie de Strasbourg SA. Interests held in the new company are Cie Française des Petroles 47 per cent, Soc. Française des Petroles BP 39 per cent, and Antar-Pechelbronn 14 per cent.

Scheduled for commissioning early in 1963, the refinery is designed to supply markets in north-eastern France, southern Germany, and Switzerland. Crude capacity will be about 3·3 million tons/year, supplies being transported via the south European pipeline now under construction from Lavera to Karlsruhe. Cost of the refinery project is estimated at approximately £22 million.

Iran's Deepest Well

Suru Well No 1, which is being drilled by the Iranian Oil Operating Companies near Bandar Abbas on the Straits of Oman, reached a depth of 13,711 ft on 2 December and thus became the deepest well ever drilled in Iran.

Its depth exceeds that of Mand No 2 at Kuh-i-Mund, on which drilling stopped on 2 December. The latter well had gone to a depth of 13,541 ft when mechanical difficulties were encountered. No oil was found. Prior to Mand No 2, the record depth was set by a National Iranian Oil Company drilling rig at Alborz No 7, which bottomed at 13,216 ft. Drilling continues at Suru No 1.

Shell to Expand Polyisoprene Production in U.S.A.

A 300-acre site is being acquired by Shell Chemical Company (U.S.A.) near Marietta, Ohio, for a new polyisoprene synthetic rubber plant.

Construction of the plant will start soon and it is expected to begin production by the end of 1961; capacity will be about 36,000 tons/year. Hydrocarbon feedstocks will come from Shell Oil Company's Wood River (Illinois) refinery.

Polyisoprene can be used virtually wherever natural rubber is used because it is chemically the same. In this respect it differs from conventional synthetic rubber. In addition, because of its scientifically-controlled production, polyisoprene has a uniform quality not found in natural rubber. At present it is being manufactured by Shell at Torrance, California, where it was first introduced. The Torrance plant is currently being expanded to an annual capacity of about 18,000 tons/year.

Exploratory Drilling in Iran

Drilling in the areas outside the Consortium concessions in Iran had reached the following stages on 18 December last.

NIOC

Alborz No 8 was being tested at a depth of 11,531 ft with the last casing at 10,697 ft. Sarajeh No 3 was rigging down pending further tests, and Sarajeh No 6 had been drilled to a depth of 205 ft. Gorgan No 5 was being tested to find out more about the formation.

IPAC

Oil shows were being tested at A-1 well in the offshore agreement area of the Persian Gulf and B-1 offshore well was also being tested.

SIRIP

No 1 well in the offshore area of the Persian Gulf had been closed in, and No 2 well, which was being drilled from the same fixed platform in the offshore area was drilling at a depth of 6955 ft. At Sequta in the Zagros Mountains, the well had been drilled to a depth of 6811 ft, and the casing was being cemented at a depth of 6470 ft.

Faster Bunkering at BP's Aden Installation

When the new Orient liner *Oriana* called at Aden on her maiden voyage recently she took on over 5000 tons of bunker fuel in four hours from the BP International Bunkering Service installation and achieved a maximum loading rate of nearly 1600 tons/hour, which is approximately twice as fast as the previous best. This was the first major test of the installation since recent modifications and developments were completed at a cost of over £200,000.

The installation has new specially designed terminal barges, new electric pumps to supplement existing capacity, and a new diesel generating system. New 16-in submarine pipelines have also been laid to certain berths and modifications have been made to much of the existing pipework and manifolds.

Oriana *calling at Aden on her maiden voyage*

Brazilian Refinery Operating

The Duque de Caxias refinery of Petroleo Brasileiro (Petrobras), near Rio de Janeiro, was inaugurated in January with a crude capacity of 90,000 bd. An island in Rio de Janeiro harbour provides facilities for both crude oil unloading and products loading and is connected to the refinery on the mainland by a 10-mile pipeline.

Crude supplies are from Brazilian or Venezuelan fields or from the Middle East. Main contractors were Foster Wheeler.

ICI Plant Expansion Continues

The increase in manufacturing capacity for high-purity ethylene in ICI's three olefin plants at Wilton from 120,000 to about 140,000 tons per annum will be accompanied by a corresponding increase in the other products of these plants; propylene, butadiene, and butenes, for example. Larger supplies of feedstock will therefore be available for the plants at Wilton and Billingham which depend on the olefin plants.

As a result, the capacity of the acetone plant at Billingham which utilizes Wilton propylene, is being expanded from about 28,000 to 36,000 tons per annum by mid-1961. Propylene is also converted to butanols at Billingham in part of the carbonylation plants, which are being extended to keep up with the demand for these and higher alcohols. Following a considerable expansion in the production of phenol at Billingham, new equipment is being installed in the phenol by-products plant complex to enable the combined production of "Topane", ICI's brand of ortho-phenylphenol, and para-phenylphenol to be raised from some 650 to 1000 tons per annum by the end of 1961.

The two para-xylene plants at Wilton are being modified to give a further large rise in capacity. Para-xylene is one of the two major raw materials for "Terylene" manufacture and is also sent to several countries overseas for the production of polyester fibres.

Increased Carbonylation Alcohols Capacity

The Heavy Organic Chemicals Division of ICI is to install a fourth unit at Billingham, Co. Durham, to increase its capacity for the manufacture of alcohols by the carbonylation of olefinic feedstocks. It will have a capacity of 30,000 tons of plasticizer alcohols a year, and will help to meet the needs of the rapidly-expanding U.K. plasticizer industry and the increasing demands of overseas customers.

The ICI range of plasticizer alcohols consists of *iso*octanol, *iso*decanol, Alphanol 79, and nonanol which, when esterified with phthalic anhydride, are used as plasticizers for pvc.

Development work is proceeding to modify the processes used for these alcohols and it is also proposed to increase the capacity of an existing unit producing normal butanol and *iso*butyl alcohol by the carbonylation of propylene. These projects will raise ICI's total carbonylation alcohols capacity to over 140,000 tons/year.

Shell's New Polypropylene Plant in U.S.A.

A polypropylene plant with a research centre and technical service laboratory is to be built by Shell Chemical Company (U.S.A.) on a 500-acre site near Woodbury, New Jersey.

The new plant, which is expected to go into operation in 1962, will have an initial capacity of about 36,000 tons/year.

Scientists at Shell Development Company's research centre at Emeryville, California, have developed the process of making polypropylene over the last four years. During this time they have drawn on extensive research and development on the polymerization of olefins by scientists at Royal Dutch/Shell Group laboratories in Britain and the Netherlands.

Chemical Fertilizer Plant for Iran

The Marvdasht chemical fertilizer plant, which is being built by Iran's Ministry of Industry and Mines, is due to be completed in about 18 months. So far the central building, foundations for other buildings, approach roads, and stores have been completed. The plant is situated some 45 km from Shiraz and will be supplied by natural gas from Gachsaran, the pipeline for which has already been laid. This pipeline is actually a branch of the main Gachsaran–Shiraz line which will eventually deliver gas to Shiraz for use by the growing number of industrial plants there.

Ten Years of Shell Lodge

In December Shell Lodge celebrated its tenth anniversary as a training establishment. This spacious 19th century mansion by the River Thames at Teddington, which was once a quiet retreat for a former British Prime Minister, Bonar Law, has become the staff college for companies of the Royal Dutch/Shell Group. Over the last ten years more than 1500 oilmen from 80 different countries have left their homes to spend a few weeks at Teddington. The "students" are already trained men—engineers, administrators, scientists, marketing specialists—destined for promotion into higher executive posts and their spell by the river prepares them for the tasks ahead.

The main work at the Lodge is the General Executive Course. There are normally 16 members with an average age of 42, and the world-wide representation of nationalities is an indication of the international nature of oil—which forms the background to the whole course. Subjects such as world affairs, the balance of international trade, and economics play an important part in the course programme.

Problems met with at high executive level are examined and the course breaks up into small discussion groups which work out possible solutions. Studies of cases that have occurred in the field are analysed and debated. Course subjects are not intended to be "taught" in the usual way. The course is designed as a means of passing on valuable information and experience gained over many years of practical effort. Therefore all the subjects, except for training sessions in the evenings on public speaking, are covered by senior executives who hold the type of post that members of the course will one day hold themselves.

After four weeks at Shell Lodge the members of the executive course go off for a fortnight to the Netherlands, where they get a good look at the various business ends of the oil world: an oilfield, a refinery, a chemical plant, and research laboratories. Finally they spend a week in either France or Germany to see how the principles and policies examined at the Lodge are put into practice by an operating company.

Other work at the Lodge includes a regular development course for promising men on the marketing side, and, for instance, a week's course for production staff. Seven rooms of Shell Lodge are devoted to a petroleum exhibition which, with the aid of graphs, diagrams, photographs, maps, scale models of equipment, geological specimens, and samples of products, depicts the world of oil and chemicals in a fashion which provides extremely useful teaching aids. Regular visits are now made to the exhibition by people from many walks of life, including scientists, college students and professors, and senior schoolchildren.

BIMCAM Luncheon

The next major step in automation would be the development of decision making apparatus. This was the forecast made by W. T. Marchment, chairman of the British Industrial Measuring & Control Apparatus Manufacturers' Association, when he was speaking at the recent BIMCAM annual luncheon at London's Hyde Park Hotel.

The guest of honour at the Luncheon was the Paymaster General, the Right Hon. Lord Mills, P.C., K.B.E. Other speakers included W. G. Thomas, president of BIMCAM, and G. C. Eltenton, F.Inst.P., F.Inst.Pet., president of the Society of Instrument Technology.

Oil Search in Australia

A survey of oil search activities in 1960 published by the Petroleum Information Bureau (Australia) shows that 20 bores were completed without success during the year on the Australian mainland and in Papua. Substantial flows of petroliferous gas were encountered, however, in bores in the Roma district of Queensland and at Bwata in Papua.

About £62 million has now been spent on the search for oil throughout the Australian continent and in Papua, and although 1960 was another year of disappointment for the oil seeker there are plans for at least eight new bores to be spudded-in. More emphasis is now being placed on geological and seismic surveys than was the case a few years ago when selection of drilling sites was often based on relatively meagre scientific knowledge. There are 12 seismic survey crews now operating in Australia whereas three years ago there were only three.

Increasing oil search activity on the eastern side of the Continent is shown by the fact that, of 25 bores begun or completed on the Australian mainland this year, all but five were in the eastern states. Exploration permits now cover nearly all of Queensland and more than half of Victoria and New South Wales. The year saw the development of new interests in off-shore areas along the New South Wales, Victorian, and South Australian coastlines. Almost all Bass Strait between Victoria and Tasmania had been "pegged".

New estimates show that Australia has about 2 million sq miles of marine sedimentary basins, and three quarters of this area is now held under permit by 80 companies or individuals.

Latest Exploration Activities

The search for oil in Australia during the three months August–October 1960 is reviewed in a report issued by the Australian Bureau of Mineral Resources. Air photography of an area of 60,000 sq miles in the Officer Basin, one of Australia's most recently discovered sedimentary basins which extends from the centre of Western Australia to the centre of South Australia, was completed. Other work undertaken is summarized below.

Queensland

At Ooroonoo on the Diamantina River near Brighton Downs, Conorada Petroleum Corp. completed Ooroonoo No 1 at a final depth of 3825 ft. Corfield No 1, drilled near Winton by Magellan Petroleum Corp, which reached a final depth of 4507 ft has been plugged back to approximately 2750 ft and completed as a water well.

In the Roma area Associated Australian Oilfields NL spudded-in Latemore Creek No 1, about 3 miles west of Pickanjinnie No 1, and reached a final depth of 4775 ft. Several gas shows were encountered in the Permian, and the interval 4229 ft–4449 ft yielded petroliferous gas. A test indicated a gas flow rate of 600,000 cu ft/day. The well has been secured. Latemore East No 1, which lies mid-way between Latemore No 1 and Pickanjinnie No 1, was abandoned at a final depth of 4724 ft. A drill stem test of the interval 4204 ft and 4340 ft yielded gas at the rate of 200,000 cu ft/day.

Union Oil Company, Kern County Land Company, and Australian Oil and Gas Corp Ltd spudded-in their joint stratigraphic test, Cabawin No 1. Target depth was 12,000 ft. The only other drilling operation in the State was on Cribb Island, Brisbane, where Standard Gas Pty Ltd was drilling a shallow hole with the object of finding gas.

Geophysical surveys in the Emerald and Comet areas were carried out by the Bureau of Mineral Resources No 1 seismic party. The Papuan Apinaipi Petroleum Co. Ltd completed a seismic survey in the Boulia area. In the Cabawin and Tara areas the Union, Kern, and Australian Oil and Gas Corp group completed one seismic and one gravity survey and is undertaking a further seismic survey in the adjoining area around Glenmorgan. Phillips Petroleum Co. completed a seismic survey in the Quilpie area and started an aeromagnetic survey in the Quilpie-Charleville area and a seismic survey in Springvale-Toko area.

New South Wales

Australian Oil Corp's Baulkham Hills No 1, a test well for natural gas, was spudded-in late in October. Shows of gas were encountered at 906 ft and 1035 ft.

Geophysical surveys have been undertaken in the Hay, Balranald, and Wentworth areas of the Murray Basin by the Bureau of Mineral Resources No 2 seismic party. Woodside (Lakes Entrance) Oil Co. NL completed a regional gravity survey on its holdings in the Murray Basin.

Victoria

Port Campbell No 2 being drilled by Frome-Broken Hill Co. Pty Ltd reached a depth of 8364 ft. While pulling up to make a connexion the bit stuck and attempts to recover the drilling string below 8150 ft failed. The hole was plugged back and successfully sidetracked. The Frome-Broken Hill Co. Pty Ltd is also to start a seismic survey in territory adjoining the Port Campbell area where the company is currently drilling Port Campbell No 2.

Woodside (Lakes Entrance) Oil Co. NL completed a seismic survey in the East Gippsland area of the State where the company has extensive petroleum tenements. Oil Development NL commenced its seismic survey in the Torquay area south of Geelong.

Northern Territory

Westralian Oil Ltd's Spirit Hill No 1 was completed at a final depth of 3003 ft.

Oil Development NL in association with Santos Ltd, commenced a shallow stratigraphic well on Bathurst Island, north-north-west of Darwin. It reached 828 ft and an unsuccessful "fishing" operation caused it to be abandoned. The Company has started a seismic survey in the Bonaparte Gulf area.

Geosurveys of Australia continued its Finke gravity survey and Associated Australian Oilfields NL commenced its Port Keats seismic survey, while Flamingo Petroleum Ltd completed the Allambi gravity survey.

Papua—New Guinea

There have been indications of hydrocarbons from two relatively thin sandstones in the region of 5000 ft at Iehi No 1, which was drilling ahead below 8500 ft, but these did not merit testing until after the well had reached final depth.

Camelot Nominees, with whom are associated the Murphy Corporation and the Burma Oil Co, is to conduct a marine seismic survey in the Gulf of Papua.

Tasmania

The Broken Hill Pty Co. Ltd has been collecting geological and other data connected with its offshore petroleum tenements but no oil exploration field work was undertaken in the State.

South Australia

The South Australian Department of Mines completed a gravity survey across the southern end of the Simpson Desert in the north-east of the State. Results indicate considerable structural variation in the basement underlying the area and depths of up to 6000 ft of sediments.

Oil Development NL in association with Santos Ltd and General Exploration Co. of Australia Ltd, is to investigate the Penola area of the General Exploration Co's tenement in the south-east of the State. If necessary a well to investigate formations 6000 ft to 7500 ft deep would be drilled.

Western Australia

West Australian Petroleum Pty Ltd completed the seismic survey in the Hill River-Dongara coastal area and started a survey in the Eneabba area west of Three Springs, but there were no drilling operations during the three months covered by the report.

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KUWAIT DEVELOPMENT PLANS FOR 1961

An outline of Kuwait Oil Company's development plans for 1961 was given in an article by the Company's managing director, the Hon. W. Fraser, reproduced in KOC's house magazine *The Kuwaiti*.

The most noteworthy in 1961 would be the commissioning of the bulk plant for the production of LPG. The project was begun in 1960, but the major cost of its construction, which was estimated at £3·5 million, would be incurred in 1961. It was hoped that the plant would be on stream by the autumn of this year, compressing and liquefying gas at three gathering centres in Burgan, treating the condensate at the refinery, and providing refrigerated storage at Mina al Ahmadi for the handling of exports of some 6000 brl of liquefied gas a day.

In addition to the expenditure on this project, the Company plans to spend £7·7 million on various other schemes. Development of existing oilfields and the search for new oil-bearing structures will involve an expenditure of approximately £3 million in 1961. Five or six rigs will be continuously employed drilling 30 additional wells in the Burgan field, three at Minagish, and six at Raudhatain/Sabriya. The test well now being drilled at Mutriba, in west Kuwait, will be completed, and a deep test may be drilled in the Mityaha region.

Additions are planned to the gathering system at Burgan and Minagish which will involve an expenditure of nearly £1 million. Among the numerous changes and extensions planned to increase capacity and flexibility in pipeline and storage operations at a cost of well over £1 million in 1961, one of the most important would be the commissioning of a fourth berth on the North Pier which would improve tanker handling and enable the Company to meet any possible increase in export requirements.

In addition more employee housing accommodation would be built and the final stage in the construction of Nadi al Ahmadi would be carried out. These and other developments in the provision of housing and amenities, water and power services, etc, would cost over £1 million this year.

Mr Fraser concluded by pointing out that, in spite of the adverse marketing conditions in the world, Kuwait in 1960 maintained its position as the world's fourth oil producing country and the second largest exporter of crude oil. The developments planned for 1961, although perhaps less spectacular than those of earlier years, were also designed to ensure that the Company maintained its position in the increasingly competitive world of oil.

IMPERIAL COLLEGE REPORT

The Imperial College *Annual Report for 1959–60* tells of a year of progress and records an increase in the number of full-time students of over 60 per cent since 1953. Among the evidences of financial support from many sources one of major significance was the undertaking by Shell Research Ltd to provide £15,000 towards the cost of a nematology laboratory at the College field station.

Of the wide range of research in progress during the year, only a few examples can be quoted. Experiments in the oil technology laboratories of the Department of Geology have been made on clay-water-oil systems—of interest in connexion with drilling muds, oil seepages, and migration. Differences have been shown in behaviour dependent on the relative proportions of the three ingredients, the nature of the clay, and the procedure involved in bringing the three together. An analytical study is being made of data relating to the characteristics of some 8000 oil pools.

In the Department of Chemical Engineering and Chemical Technology it is reported that laboratory and field studies are in hand to improve the design of large storage tanks for liquid methane. In addition three investigations are under way with the aim of increasing separation performance of low-temperature distillation columns by improving hydraulic stability, promoting mass-transfer, and by allowing heat to be added to or removed from distilling systems.

U.K. OIL EQUIPMENT ORDERS

During the year 1960 the following quantities of petroleum equipment were exported from the United Kingdom. Comparative figures for 1959 are also given.

	1960		1959	
	Quantity cwt	*Value* £	*Quantity* cwt	*Value* £
Oil fuel burning equipment ...	21,352	979,627	22,622	920,730
Oil well drilling machinery ...	73,052	2,348,328	152,427	4,731,212
Mineral oil refining machinery ...	197,993	3,411,927	55,799	1,483,805

Books and Films

Middle East Concessions and Saharan Oil

Most people, at least those within the industry, can name the major crude oil producing companies in the Middle East. Far fewer, however, know a great deal of the other concession holders in the various producing and non-oil producing countries of that area. To remedy this omission the Petroleum Information Bureau has published a concise list of Middle East oil concessions with details of the licence-holding companies.

In addition the Bureau now has a fresh addition to its permanent set of regional oil memoranda. Entitled "Oil in Africa" it should clarify much of the rather complex situation for the non-specialist reader. In the space of nine foolscap pages a short history of oil exploration in the continent is given bringing the reader up to date on the spectacular oil discoveries of the last few years. Much of the attention is naturally devoted to the developments in the French and Libyan Sahara, but such subjects as the economic aspects, oil consumption, and refining are also reviewed. The text is supplemented by a map of the oilfields, refineries, and pipelines in North Africa.

Further information releases newly published by PIB give revised tabular detail of world oil refining capacity at the end of 1959 by countries, whilst revised basic memoranda include those on "Oil in Latin America", "Oil in Britain", "Oilfields of the Commonwealth", and "Oil in the Far East". The revised information sheets on world oil reserves give estimated proven reserves (excluding natural gas liquids) as 290,000 million brl at the end of 1959. An explanation of "proven", "possible", and "future" reserves is given, and a most illuminating graph shows the huge disparity in the growth of proven oil reserves since 1930 as opposed to the growth of world oil production, despite the latter's ever-increasing level.

All the above publications are available, free of charge, from the Petroleum Information Bureau, 29 New Bond Street, London, W.1.

Natural Gas in Canada

In the last three years the production and distribution of natural gas has become one of Canada's most important industries. In 1958 natural gas production contributed some 25 per cent of total gas output in the country, whilst its share of Canada's total domestic energy supply has risen from 3·4 per cent in 1952 to 11 per cent in 1959. Proved recoverable reserves of natural gas have increased more than three-fold over the last decade in Western Canada alone to reach a total of over 26 million million cu ft. Ultimate reserves of natural gas are estimated to be as high as 300 million million cu ft.

A detailed statistical picture of the growth of the industry in Canada is provided by a new publication from the Mineral Resources Division of the Candian Department of Mines and Technical Surveys, entitled *A Survey of The Natural Gas Industry in Canada 1957–59*. Compiled by R. A. Simpson and R. L. Borden, it is a companion publication to the survey of the Canadian petroleum industry by the same authors which was reviewed in the *IP Review* May 1960. The various sections cover geology and related significant gas discoveries; exploration and development; production; processing; and transportation and marketing. The final section provides a table of natural gas production by various countries of the world over the last few years.

The text is supplemented by comprehensive statistical information, charts, and maps. Together with the previous volume it provides an invaluable statistical appraisal of the country's combined petroleum and natural gas industries. Price 50 cents, it is available from The Queen's Printer and Controller of Stationery, Ottawa.

Influenza and the Safety Factor

Months of research by a team of investigators has convinced the British Safety Council that there is a direct link between influenza and accidents. In a report entitled "The Invisible Factor" the Council calls for mass vaccination in industry and among road users.

This, it is claimed, would guard against that "off-peak" condition just before flu strikes when individuals are more accident prone because judgment is impaired by physical discomfort. Current flu vaccines, which cost only a few shillings and are even free under the Health Service for many people, will give up to 80 per cent protection throughout the winter.

The report contains case histories showing how people trying to "shake off the flu" are a menace to themselves and the public generally. During the Asian flu epidemic of 1957 for example road accidents involving illness were more than 27 per cent higher than in other recent years.

Basic Synchros and Servomechanisms

With the growth of automatic process control, or automation, the need for technicians trained in the fundamentals of the electrical and electronic devices upon which synchros and servomechanisms are based is an essential. Some years ago at the request of the U.S. Navy, the New York firm of Van Valkenburgh, Nooger, & Neville Inc, developed a course on the fundamentals of electricity and electronics and British editions of the two manuals "Basic Electricity" and "Basic Electronics" were published by The Technical Press Ltd.

A new manual which forms part of the original course and which is entitled "Basic Synchros and Servo Mechanisms" has now been published in a British edition by The Technical Press Ltd, price 16*s* per volume. The volumes are well-illustrated by numerous diagrams which lucidly explain the points made in the text. They should prove invaluable in training centres and to the individual wishing to learn something about the subject.

The War Against Subtopia

In July 1957 the Civic Trust was publicly inaugurated to encourage high quality in architecture and planning; to preserve buildings of artistic distinction or historic interest; to eliminate and prevent ugliness, whether from bad design or neglect; and to stimulate public interest and inspire a sense of civic pride. Noble and ambitious objects, such aims—and their successful fulfilment—are imperative if any beauty is to be retained in Britain in an age of commercial and industrial ugliness.

Thanks to the public spirit of many leading firms in industry the Trust was provided with funds to launch a substantial programme of activity. A review of work to date is contained in a booklet *The First Three Years*, the report by the Trustees, who include apart from its president, Duncan Sandys, and C. M. Vignoles, several other influential persons in public life.

An impression of the work of the Trust, which is greatly facilitated by a joint advisory committee from the Royal

Institute of British Architects, the Royal Institute of Chartered Surveyors, the Institution of Civil Engineers, and the Town Planning Institute, is given with the aid of some particularly striking "before and after" photographs of architectural "face lifting" in such as Magdalen Street, Norwich, and Burslem market place. Probably the most widely-known example of the Trust's crusading endeavours was the Piccadilly Circus Inquiry at the end of 1959.

The means of awakening public interest by film and exhibition are described as are the civic design awards, the site clearing of derelict "eyesores" by enthusiastic volunteers, and its advisory facilities to help with local problems. The three-year old appears to be a lusty, thriving infant, with immense working potential.

Organic Chemical Reagents

Monograph No 41 in the series Organic Reagents for Metals—now called Organic Chemical Reagents—published by Hopkin & Williams Ltd, Chadwell Heath, Essex, is concerned with 4 : 7-diphenyl-1 : 10-phenanthroline ("bathophenanthroline") reagent for iron.

Monographs No 1–27 have now been published in a collective volume under the title *Organic Reagents for Metals and Other Reagent Monographs*, price 15s net, post free.

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RECORD MIDDLE EAST OIL PRODUCTION

A record output of 264 million metric tons of oil was produced in the Middle East last year according to Petroleum Information Bureau estimates. This was a rise of 33 million tons, or 14·4 per cent over the 1959 total.

All the leading countries showed substantially higher outputs compared with the previous year. Kuwait yielded 81·8 million tons, Saudi Arabia produced 60·8 million tons, and Persia and Iraq supplied 52·0 and 47·5 million tons respectively. Thus each one of these four countries yielded enough oil to meet Britain's entire requirements last year. Chief among the other producing areas were Qatar, which provided 8·2 million tons, and the Kuwait–Saudi Arabia Neutral Zone whose output was 7·3 million tons. The remaining oil was produced in Egypt, Bahrain, Turkey, and Israel.

The Middle East now supplies almost as much oil as was produced in the entire world as recently as 1938 (when global output was 280 million tons), but since that time world production has risen so rapidly that the region only contributed about a quarter of the oil produced throughout the world in 1960.

Details of the Middle East production are as follows:

	1960	1959
	Metric Tons	
Kuwait	81,862,805	69,532,498
Saudi Arabia	60,860,423	53,956,891
Persia	52,064,856	45,631,832
Iraq	47,482,948	41,732,039
Qatar	8,212,360	7,992,516
Kuwait S.A. Neutral Zone ...	7,273,339	6,195,288
Others	6,335,546	5,825,460
Total	264,092,277	230,866,524

World Tanker Fleets

The world's oil tanker fleet increased by 3,575,418 tons gross in 1960 to 41,465,102 grt. Oil tankers accounted for 32 per cent of all steamships and motorships compared with 30·3 per cent in 1959.

Steam-powered tankers amounted to 24,093,903 grt, of which 1,108,659 grt had reciprocating engines and 22,985,244 grt were driven by turbine engines. Motorship tonnage was 17,371,199 grt.

These figures are given in *Lloyd's Register of Shipping Statistical Tables 1960* which show that for the second successive year Liberia with 410 ships of 7,183,062 grt was the leading country of ownership. Great Britain remained the second largest tanker-owning nation with 855 vessels of 7,050,474 grt. Next came Norway (561 ships of 6,372,917 grt), and the United States (482 ships of 4,633,981 grt).

Great Britain recorded the largest increase of any nation with 661,199 grt more than in 1959. Norwegian tanker tonnage rose by 444,211 grt and United States tonnage by 294,025 grt. But the most spectacular increase was achieved by Greece with an additional 590,038 grt to more than double its 1959 tonnage with 84 ships of 915,982 grt. This was due to the transfer of registrations from Liberia and Panama as well as to new tonnage.

Tanker ownership is shown below.

WORLD TANKER FLEETS 1960
100 gross tons and over

Country of ownership	*Number*	*Tons gross*
Great Britain and N. Ireland ...	855	7,050,474
Other Commonwealth	123	329,856
United States	482	4,633,981
Argentina	59	343,562
Belgium	12	157,917
Brazil	42	297,143
Chile	4	34,262
China (Nationalist)	8	46,484
China (Communist)	11	18,150
Denmark	77	872,358
Egypt (U.A.R.)	4	37,175
Finland	23	169,987
France	153	1,857,884
Germany (East)	2	15,898
Germany (West)	103	560,148
Greece	84	915,982
Honduras	3	8,637
Iceland	4	13,839
Indonesia	4	6,094
Irish Republic	7	28,716
Israel	4	40,696
Italy	209	1,725,576
Japan	485	1,568,742
Liberia	410	7,183,062
Mexico	19	123,554
Netherlands	135	1,357,174
Norway	561	6,372,917
Panama	188	2,500,300
Peru	10	33,889
Philippines	6	5,845
Poland	7	48,365
Portugal	14	123,444
U.S.S.R.	121	692,675
Spain	61	449,729
Sweden	169	1,317,977
Turkey	14	67,693
Venezuela	29	257,981
Yugoslavia	8	52,735
Other countries	33	144,201
WORLD TOTAL	4,443	41,465,102

Lectures, Courses, and Conferences

Informal Discussion on Cybernetics

The Industrial Administration and Engineering Production Group of the Institution of Mechanical Engineers is to hold an informal discussion on "Human Capabilities and Limitations in Industrial Operations" in the Institution's main meeting hall on 13 March 1961.

Titles of lectures to be given include Problems of Display and Control, Effect of Environmental Conditions on Performance and Comfort, Human Factor Problems of Automatic Processes, and The Investigation of Human Capabilities and Limitations. Applications to attend should be made to the Secretary of the Institution, 1 Birdcage Walk, Westminster, S.W.1.

Distribution of Oil

Five lectures on the distribution of oil will be given at Sir John Cass College, Jewry Street, Aldgate, London, E.C.3, from 5–7 April, 1961. The course is designed to outline distribution in its widest aspects. Adequate time will be allowed for discussion and questions, and following the final lecture there will be a "Brains Trust" when all the lecturers will be present to reply to general questions.

Problems of the Mineral Oil Economy

A congress to discuss "Topical Problems of the Mineral Oil Economy from an International Aspect" will be held in Vienna from 20–24 March by the International Educational Association of Wiesbaden, Germany, and the Federation of the Mineral Oil Industry in Austria.

Representatives from twelve nations are expected to attend. Subjects to be discussed include European energy policy and the integration of Saharan oil and gas; hydrocarbons as a propelling force, as a lubricant in aviation, and as a basis for new materials; rationalization in the mineral oil industry; and the State and the raw oil economy.

Information about the congress can be obtained from the International Educational Association, Wiesbaden, Germany.

Gas Chromatography Practice

A short full-time laboratory course on the practice of gas chromatography will be held at the Department of Chemistry of Brunel College of Technology on 1–5 May 1961.

Intended for those requiring a basic training in the use of the gas chromatograph, the course will include an examination of column design, together with practical experience in problems of qualitative and quantitative analysis of complex mixtures of natural and synthetic origin.

Applications for enrolment, enclosing the £5 fee for the course, should be made to the Registrar, Brunel College of Technology, Woodlands Avenue, Acton, London, W.3.

Engineering Aspects of Lubrication

A short, but intensive, full-time post-graduate course on "Engineering Aspects of Lubrication" will be held under the general direction of Dr A. Cameron at the Imperial College of Science and Technology from 1–19 May 1961.

About half of the 36 lectures will be on the theory of fluid film and thin film lubrication wear, while the remainder will deal with the materials normally used. There will be tutorial periods for problems to be worked out in detail, and laboratory periods to allow for practical work on a number of rigs for the study of full fluid and thin film lubrication.

The fee for the course is 25 gns. Full details may be obtained from the Registrar, Imperial College of Science and Technology, London, S.W.7.

Industrial Finishes

The first Industrial Finishes Exhibition and Convention will be held at Earls Court, London from 8–11 May 1961.

The preliminary list of subjects on which papers are to be read at the convention includes water soluble resin finishes, high temperature paint curing techniques, and metal and plastic coatings. Registration fee to attend the convention is £1 1*s*, or £3 3*s* with pre-prints. Entry to the exhibition is free.

Organizers are Scientific Surveys Ltd, 97 Old Brompton Road, London, S.W.7.

Layering of Fluids of Different Densities

The Safety in Mines Research Establishment of the Ministry of Power has a programme of research concerning the formation, movement, and mixing of methane layers in mine roadways. The basic information already acquired will be applicable in many other fields, and a symposium is to be held at the Establishment's field laboratories, Harpur Hill, Buxton on 9 May. The communications and discussions will be aimed at chemists, engineers, and physicists having design and control problems concerned with the stratification of fluids of different densities.

Applications to attend the symposium should be addressed to "Symposium", Safety in Mines Research Establishment, Ministry of Power, Portobello Street, Sheffield, 1.

Laboratory Apparatus and Materials Exhibition

The second national Laboratory Apparatus and Materials Exhibition, sponsored by *Laboratory Practice*, will be held in the Royal Horticultural Society's New Hall, Westminster, from 19–22 June 1961.

A wide variety of British and overseas equipment will be shown and demonstrated.

Process Optimization

One of the two one-day meetings to be held as part of the Third Congress of the European Federation of Chemical Engineering, which will take place in London from 20–26 June 1962, and is being organized by The Institution of Chemical Engineers, will be devoted to the subject of "Process Optimization".

It is intended to review the field of application of the main techniques used in optimizing the performance of chemical plant and applicable in the design and operational stages. Suggestions for papers, including titles and summaries, should be sent to The General Secretary, The Institution of Chemical Engineers, 16 Belgrave Square, London, S.W.1, not later than 30 April.

Social and Economic Effects of Automation

A Conference on "Automation—Men and Money" will be held at Harrogate on 27–30 June, 1961 under the aegis of the British Conference on Automation and Computation of which the Institute of Petroleum is a member organization.

This will be the first British conference on the social and economic effects of automation. Enquirers should communicate with the Conference secretary, c/o The British Institute of Management, 80 Fetter Lane, London, E.C.4.

Rheological Techniques

The British Society of Rheology and the Non-Destructive Testing Group of the Institute of Physics and Physical Society will hold a joint meeting on Rheological Techniques at Llandudno on 21–22 September 1961. The aim of the meeting will be to discuss rheological techniques in detail. Usually in the presentation of a paper, discussion of experimental results is given at the expense of the description of the techniques. It is intended that on this occasion the opposite will be true. The proceedings of the meeting will be published in special issues of *Laboratory Practice*. Contributions to the meeting are invited, and intending speakers should write to Dr M. F. Culpin, 8 The Broadway, Pontypool, Monmouthshire.

Pipeline Coatings

Speaking to the Pipeline Industries Guild recently, John Rogers, M.A., M.Sc.Tech., A.F.Inst.Pet., said that steel pipelines were lined to prevent internal corrosion, to maintain pumping efficiency, and to ensure the purity of the material carried in the line.

The principal types of lining are based on bituminous materials, cement mortar, and synthetic resins. He described how bituminous coatings, used in drinking or salt water lines, are applied by spinning the pipes with the molten coating material inside. Cement linings, he said, are applied either to individual pipe lengths or to lines *in situ* and are finding increasing use in oil and water lines.

Thin organic coatings based on epoxy or phenolic resins have been employed on a large scale during the past ten years in the gas and oil industries, and Mr Rogers referred in detail to lining pipelines already installed with epoxy resin paints, and he said that lines of over 20 miles in length could be treated in one operation.

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DIESEL FUME ABATEMENT MEETING

The first committee meeting of the Diesel Exhaust Fume Abatement Society (DEFUME) met recently at the home of Lord Colwyn in London. Among the committee members present were Sir Walter Fergusson-Hannay, J. Maguire, of the United Commercial Travellers Association, Christmas Humphreys, Q.C., and the Earl of Coventry.

After an introduction by Lord Colwyn in which he stressed that the society had no intention of trying to resist the increase in the use of diesel fuel, but was interested rather in making it safe and clean—Sir Walter Fergusson-Hannay spoke on diesel fumes and health. Sir Walter began by emphasizing the inadequate state of our present knowledge and regretting that cigarette smoking had been given by the government so prominent a place among the causes of cancer of the lung. Both he and the next speaker, Mr Maguire, claimed that too much emphasis had been placed on purely chemical analyses to the exclusion of physical properties. On a chemical analysis it was possible to indicate that smoke in a room in which a man had just been asphyxiated was harmless.

A. Aikens, of Oxy-Catalyst Sales Ltd, representing the Vokes Group, gave a description of the work being done by his company in the use of an oxidation catalyst to accelerate the combustion at a lower temperature of the unpleasant compounds remaining in the combustion chamber after reaction has taken place. It was said that the temperature at which the catalyst began to be effective was unfortunately too high to make the muffler universally applicable. Work was at present in progress to produce a catalyst which would operate at a lower temperature. The present catalyst began to function at a temperature of 500° F when carbon monoxide and hydrogen could be oxidized, but to deal with the diesel oil vapour and black smoke a temperature up to 700°–800° F was necessary. The catalyst currently being used was a combination of alumina and platinum carried on a porcelain support.

It was stated by K. B. Hopfinger, M.S.A.E., M.S.I.A., an engineering consultant to Simms Motor Units, that there was no technical reason for dirty exhausts. It was purely a question of a law being drafted in such a manner that this could be relieved. He thought that a roof-level exhaust would be far preferable to present designs and said that this was again largely a matter of law, compulsion already being in force in certain countries. It was pointed out that the Lebanon government was on the verge of prohibiting the use of diesel engines.

Engines usually left the factory with clean exhaust readings, the speaker said, and then when in service lack of maintenance, particularly to the fuel pumps, causes exhaust trouble. The company represented by the speaker had developed a tamper-proof exhaust fuel device which prevented the emission of black smoke. It was fitted to the fuel pump and it was guaranteed the driver could not interfere with it unless he mechanically damaged the pump itself.

Although conceding that proper maintenance of good equipment would greatly reduce black smoke, J. Cunningham, M.S.M.A., M.Inst.Pet., of United Lubricants Ltd, said that he could not see that there would be any issue between injector manufacturers and oil chemists. It would be impossible for legislation to enforce improved vehicle maintenance because an engine can be corrected as it leaves the maintenance bay and the spray pattern then confused by carbon within a few hundred miles. Attention was drawn to the research work carried out by the Nobel Division of ICI on *iso*propyl nitrate used as an additive in diesel fuels. Stemming from this, United Lubricants had processed *iso*propyl nitrate and produced a product known as *Isotane*, which had been used in ICI's own vehicles with success.

A. J. Hodsdon, of the Vigzol Oil Co. Ltd, reported that his company had launched a product known as *Vitasul* which was a liquid fuel additive formulated primarily to eliminate the odour of diesel exhaust and reduce its irritation effects. The intention had been to combat the psychological nuisance value of such exhausts.

It was thought by M. Wigan, of Combustion Chemicals Ltd, that the engine manufacturers had gone as far as was possible in dealing with the type of diesel fuel available to-day. It was the quality of this fuel, he said, which was causing so many of the diesel exhaust troubles. There were only two ways of dealing with the exhaust smoking problems. First, for legislation to be enacted to make the fines for emitting smoke from vehicles extremely heavy, or alternatively to convince vehicle fleet owners that a smoking diesel vehicle was inefficient and that any chemical or other remedial treatment would show economies in operating costs.

A public meeting was decided on for early this year at which membership of the society would be recruited.

Equipment Developments

The Autovista Refuelling System

British Petroleum Company's revolutionary new Autovista system of dispensing fuel is the first major break-through in pump design since garage pumps were introduced at the turn of the century.

A single Autovista will dispense a variety of types or grades of fuel, and for the first time, the hose unit, the pump, and the computer are contained in separate items of equipment. These can be sited independently of each other and will allow greater flexibility in the layout of the service stations of the future.

The Autovista's hose unit being demonstrated. Inset is the price and volume indicator

When the driver pulls into the service area the price and volume indicator will be positioned just ahead of the car where it can be seen from the driving seat. This same piece of equipment will incorporate the pre-selector switches, which allow the fuel to be ordered by price or volume, and a grade panel which will indicate the type of fuel being delivered. The hose unit will coincide with the rear of the car to allow easy access to the tank inlet. There is a separate hose for each type of fuel and those for the standard and premium grades of gasoline terminate in a blending unit with a common nozzle so that a blended grade can be supplied if required.

The Autovista pump-meter unit will normally be underground and will serve several sales points. The rotation of the meter spindle generates two trains of electric impulses which, in response to the operator's dial settings, govern the delivery of type and volume of fuel required and control the readings of the price and volume indicators. The Autovista is claimed to give the most rapid fuelling yet achieved with a rate of 15 gal/min. It will deliver a printed sales statement and is easily adapted for self-service operation where regulations permit. It can also be arranged for a set of electrical pulses to transmit information to a central supply and accounting depot where bulk deliveries can be planned.

Design study was carried out by BP's Distribution Engineering Branch, and the overall design development by the De Havilland Engine Company. The Compagnie de L'Esthetique of Paris was responsible for the styling of the units.

Jet Fuels Anti-Icing Additive

A new chemical additive which prevents in-flight ice formation in aircraft jet fuel systems has been developed by Phillips Petroleum Company. It has successfully undergone exhaustive tests by the U.S. Air Force and the Boeing Airplane Company.

Phillips developed the new compound, PFA 55MB, with its own research funds, and it is immediately available in sufficient quantities to meet the needs of military and commercial jet aircraft, and guided missiles using jet fuel. It is compatible with materials it contacts in fuel systems, while not adversely affecting the thermal stability of jet fuel.

A very small amount of the anti-icing compound added to jet fuel is reported to provide more complete protection than heaters. This patented development also prevents ice formation from condensation and other sources in the giant fuel tanks and other parts of the aircraft fuel system not served by heaters.

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Trade Literature, etc.

Greenland Test for Outboard Motor

A Perkins 6 hp outboard motor successfully underwent a gruelling test in waters around the Arctic Circle recently when it was loaned by Perkins Outboard Motors Ltd to the St Andrews University South Greenland Expedition.

It was used for a total of 32 hours to power a 14ft whaler, often in extreme cold, without giving trouble. It used 25 gal of fuel and 11½ pints of oil and never had to be stripped.

New Films from Perkins Engines Ltd

New 16mm black and white films named respectively *The Six 354*, which runs for 17 min and tells the story of the development and production of the Company's new 112 bhp direct injection transport diesel engine, and *Why The Diesel?—No 1, The Vehicle Operator*, a 10-min film showing the advantages of diesel-engined vehicle operation, are available on loan free of charge throughout the U.K. on application to the Perkins Film Unit, Peterscourt, Peterborough.

Water Supply Treatment

W.G. Pye & Co. Ltd has recently issued a series of three application sheets featuring the company's pH meters. They deal with the measurement and control of boiler condensate return water, the significance of pH in the treatment of boiler feedwater in high pressure boilers, and the aspect of pH in water supply treatment.

Copies may be obtained from the Company at Granta Works, PO Box 60, Cambridge, England.

Positive Air Blowers

Descriptions and specifications of *Holmes-Connersville Type RBS* positive air blowers are given in a colourful 8-page brochure obtainable from W. C. Holmes & Co. Ltd, PO Box No B7, Turnbridge, Huddersfield. A number of modifications have recently been incorporated in the range.

Airlift to Save Blazing Tanker

More than 3000 gal of *Pyrene* foam compound was flown out to Bahrain recently to help three ships of the Royal Navy combat fire aboard the abandoned Norwegian tanker *Polyana*, ablaze in the Persian Gulf.

The fire was brought safely under control and a blanket of foam was maintained to prevent re-ignition. The *Polyana* was able to continue her journey and has since discharged her cargo of 24,000 tons of crude at the Isle of Grain refinery.

ICI Publications

Among booklets issued recently by ICI to describe the products of its Metals Division are *ICI Titanium* 3, and *ICI Rods and Sections Copper and Copper Alloys*.

The first publication deals with the corrosion resistance of titanium and includes tables which specify the resistance of the metal to simple chemical reagents and industrial liquors, as well as liquid metals. The second booklet describes the production, properties, and the applications of the principal alloys made by the Company as extruded rod and section.

Copies of the booklets can be obtained from the Metal Division headquarters of the Company, P.O. Box 216, Birmingham 6.

British Company to Manufacture American Valves

Weir Valves Ltd of Glasgow will henceforth manufacture and market the products of Pacific Valves Inc. of Long Beach California outside the U.S.A. The Company will continue to be controlled by G. & J. Weir Holdings Ltd, but has changed its name to Weir-Pacific Valves Ltd.

In addition to the present range of valves manufactured by Weir Valves Ltd for marine purposes, globe, gate, check and swing check valves in cast and forged steels are now being manufactured as well as ball valves, an entirely new type of valve developed by the American company.

Fire Protection on Lake Maracaibo

Fire protection at the San Jacinto Oil Company gathering station on Venezuela's Lake Maracaibo is given by the *Fire-Fog* system manufactured and installed by Automatic Sprinkler Corporation of Venezuela.

Within seconds of the slightest fire being detected by the rate-of-rise heat actuated devices sited throughout the station, 146 *Fire-Fog* nozzles, located in strategic areas in the maze of pipes and tanks, are set off. These detection devices trip a release which starts a flow of nitrogen gas from a pressure cylinder. The gas is then propelled through the air motor, starting a diesel engine which drives a 1500 gal/min vertical turbine fire pump at 100 lb pressure.

New Straddle Truck Carriers

The instant response and positive control provided by hydraulic lifting are advantages contained in a new series of 20,000- and 30,000-lb capacity straddle truck carriers introduced by the Hyster Company of Portland, Oregon.

The Hyster M200F and M300F carriers have two high-pressure pumps, supplying the power for the load shoe swing and the power steering. An exclusive full-flow hydraulic oil filter removes impurities from the system which could clog and damage vital parts. A choice of two power plants is available—a 153-hp, V-8 gasoline or LPG engine, or an 83-hp six-cylinder diesel unit.

New Headquarters for Matthew Hall & Co. Ltd

Over 1000 administrative and drawing office staff of Matthew Hall & Co. Ltd recently moved into the Company's new headquarters in London's Tottenham Court Road, which is to be known as Matthew Hall House.

The Company held its annual cocktail parties and exhibition on 6 and 7 December 1960, in the Ballroom Suite at the Dorchester, London. Nearly 800 guests were welcomed to the functions. The exhibition included a display of photographs and models which well illustrated the wide range of the Company's activities, and gave a good impression of the various types of contracts entrusted to Matthew Hall.

Silicones and Their Uses

ICI Silicones Properties and Products, a new 12-page booklet issued by the Nobel Division of ICI, Stevenston, Ayrshire, Scotland, lists the Company's silicone products and summarizes their main applications. Separate data sheets are also available to describe each product in more detail.

Castrol Girling Brake and Damper Fluids

The brake and damper fluids manufactured by Castrol on behalf of Girling Ltd and hitherto marketed as "Wakefield Girling Brake and Clutch Fluid Crimson", "Wakefield Girling Damper Oil Thin" and "Wakefield Girling Luvax Damper Oil Thick" have been renamed and will be known in future as "Castrol Girling Brake and Clutch Fluid Crimson", "Castrol Girling Damper Oil Thin", and "Castrol Girling Damper Oil Thick".

Although the names have been changed specifications remain the same.

Gas Turbine Locomotive on Trial

A 2700 hp experimental gas turbine locomotive, GT3, designed and built as a private venture by the English Electric Company has started trials on the London Midland Region of British Railways.

It resembles a conventional steam locomotive in appearance and is powered by an English Electric EM27L gas turbine. With a fully loaded tender carrying 2000 gallons of gas oil and 1750 gallons of water it weighs 123 tons. Overall length is 68 ft.

New Series of Technical Booklets

Pyramid Instrument Corp. is issuing a series of booklets dealing with servicing failures in electrical circuitry. A new title will be published each month and each one will describe factual, field tested findings and methods.

The first title is *Trouble Shooting Motors with a Volt Ammeter*, and is available from *Amprobe* stockists or Pyramid Instrument Corp., Sales Division, H. J. Baldwin & Co. Ltd, 221 Grand Buildings, Trafalgar Square, London, W.C.2.

New Portable Compressors

Chamberlain Plant Ltd reports that the water-cooled and air-cooled models of the larger *Jenbach* JW440KF diesel portable compressors are now available in the United Kingdom. These have the engine and compressor combined to form one integral unit whereby the power of the four-stroke engine is transmitted direct to the compressor by means of the main and ancillary connecting rods.

FOR SALE

WATERFOG and Waterspray Installations, automatic or non-automatic, designed and installed for Fire Fighting. Also complete Foam Installations. Fire Armour Limited, 9 George Street, London, W.1.

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Forthcoming Meetings

THE INSTITUTE

(*At* 61 *New Cavendish Street, London, W.*1, 5.30 *p.m.—tea* 5 *p.m.*)

Surface Active Compounds in Lubricating Oils. A. Groszek, M.Sc., and D. J. Palmer. **15 March**

Airborne Techniques in Petroleum Exploration. W. Domzalski, A.R.S.M., B.Sc., D.I.C., Ph.D. **5 April**

IP ECONOMICS AND OPERATIONS GROUP

(*At* 61 *New Cavendish Street, London, W.*1, 5.30 *p.m.—tea* 5 *p.m.*)

The Growth of Road Traffic and Motor Fuel Consumption. Dr R. J. Smeed. **9 March**

A Review of the Year. D. Ovens. **13 April**

IP EXPLORATION AND PRODUCTION GROUP

(*At* 61 *New Cavendish Street, London, W.*1, 5.30 *p.m.—tea* 5 *p.m.*)

Petroleum Exploration in Peru. A. J. Knights. **March 23**

IP FAWLEY BRANCH

(*At Esso* (*Fawley*) *Recreation Club, Holbury*, 5.30 *p.m.*)

The Modern Car. K. E. W. Ridler, B.Sc., Ph.D., and R. D. Foord-Kelcey, A.M.I.Mech.E. **5 April**

IP LONDON BRANCH

(*At* 61 *New Cavendish Street, London, W.*1, 6 *p.m.—tea* 5.30 *p.m.*)

Luncheon Meeting **15 March**

Fifty Years in the Oil Industry. George Sell. **21 March**

IP NORTHERN BRANCH

(*At Engineers' Club, Albert Square, Manchester* 2, 6.30 *p.m.*)

Petroleum in the Service of Agriculture. **21 March**

IP SCOTTISH BRANCH

(*At BP Refinery Recreation Hall, Grangemouth*, 7.30 *p.m.*)

The Production and Applications of Synthetic Rubber. K. G. Burridge. **23 March**

IP SOUTH WALES BRANCH

(*At the Training Centre, BP Refinery* (*Llandarcy*) *Ltd*, 5.30 *p.m.*)

Petrochemicals. F. A. Fidler, M.Sc., Ph.D., F.C.S. **16 March**

IP STANLOW BRANCH

(*At Administration Offices, Shell Stanlow Refinery*, 5.30 *p.m.*)

The Carrington Pipeline. L. C. Knight, B. S. Lidington, G. G. Rose, Ph.D. **15 March**

(*Lecture Theatre, Grosvenor Museum, Chester*, 7.30 *p.m.*)

Some Corrosion Problems in the Chemical Industry. D. Bennion, B.Sc., A.R.I.C., Dip.Chem.Eng., A.M.I.Chem.E. **19 April**

IP YORKSHIRE BRANCH

(*At Great Northern Hotel, Leeds*, 7 *p.m.*)

Chemicals from Petroleum. J. E. Garner. **8 March**

(*At Old Swan, Harrogate*)

Annual Dinner and Dance. **24 March**

THE SOCIETY OF INSTRUMENT TECHNOLOGY

(*Belle Vue Hotel, Cheltenham*, 7.30 *p.m.*)

Instrumentation Developments in the Petroleum Industry. G. C. Eltenton, B.A., F.Inst.P., F.Inst.Pet. **19 April**

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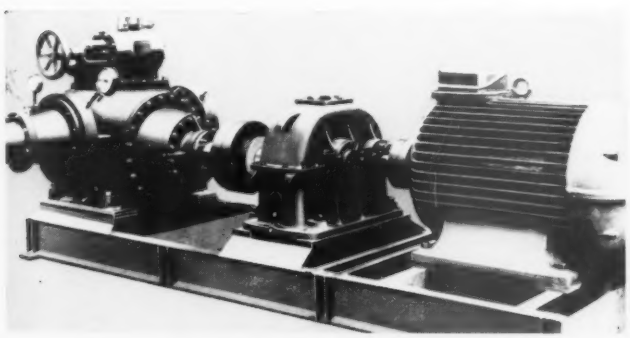
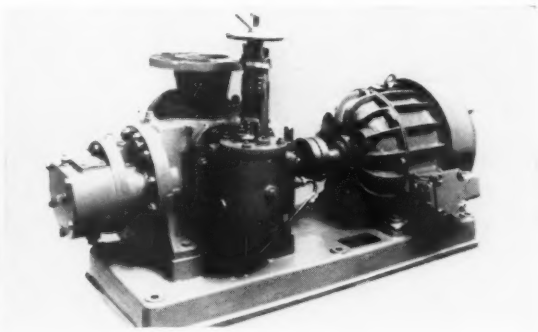




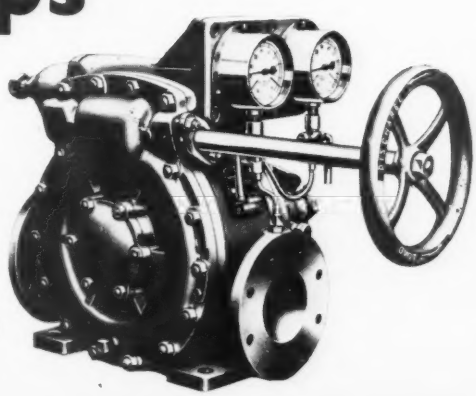
S & P Fuel Pumps

Stothert and Pitt Ltd. build a range of displacement pumps with capacities up to 1000 tons per hour designed to meet the special needs of the Petroleum Industry. By their ability to pump against a vacuum the pumps give reliable service when operating continuously under varying conditions of suction lift and viscosity.

Above right is a Screw Displacement Pump. Of all round clearance design, it has a high suction lift. The flow is pulsation free and the unit self-priming.

Above left is a Variable Output Rotary Piston Pump. It is almost pulseless and is electrically driven through a reduction gear box.

On the right is a Reversing Flow Rotary Displacement Pump for fitting on tank wagons. It is normally driven from the lorry power take-off.



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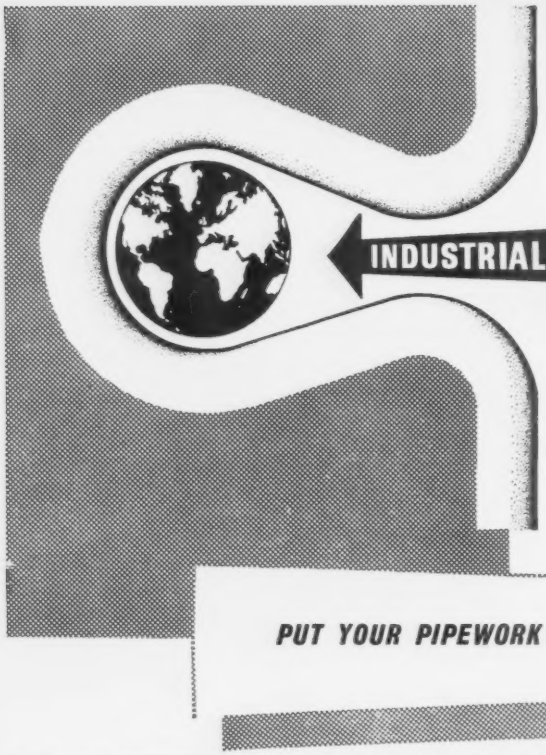

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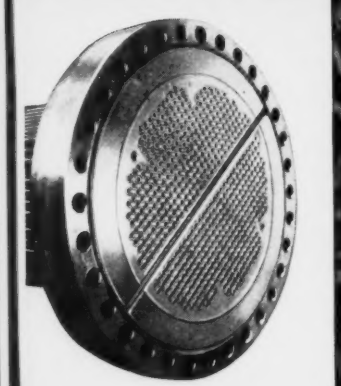

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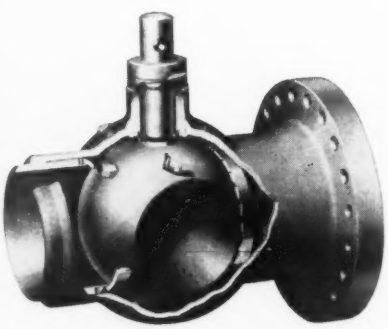

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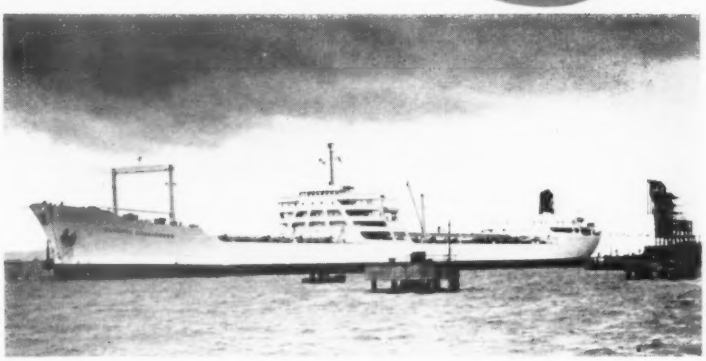

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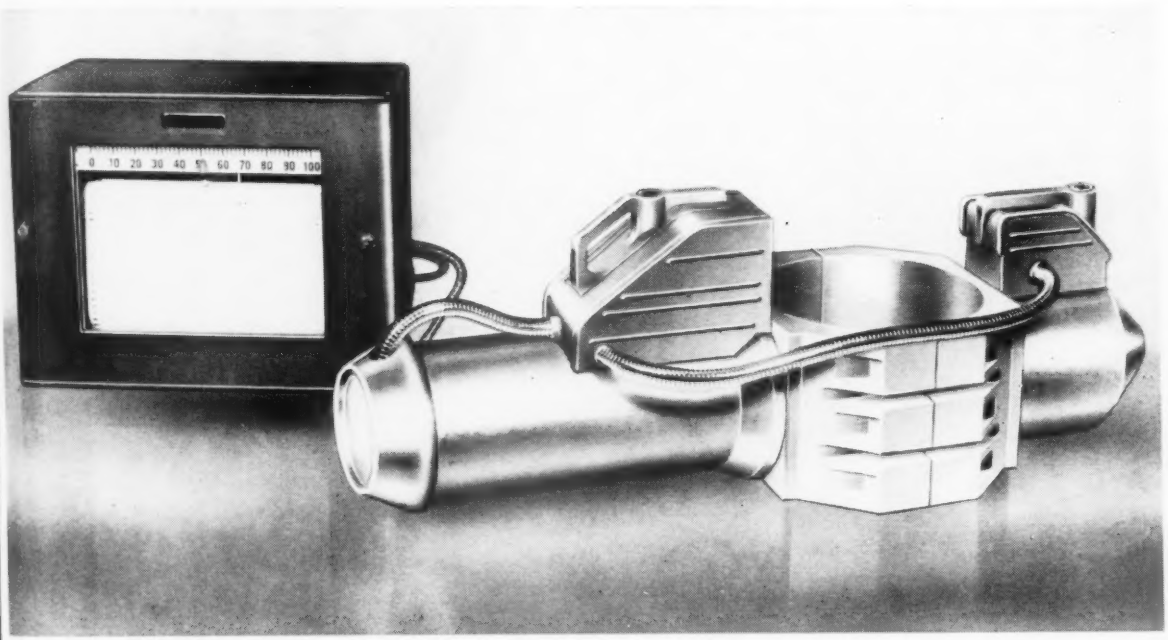

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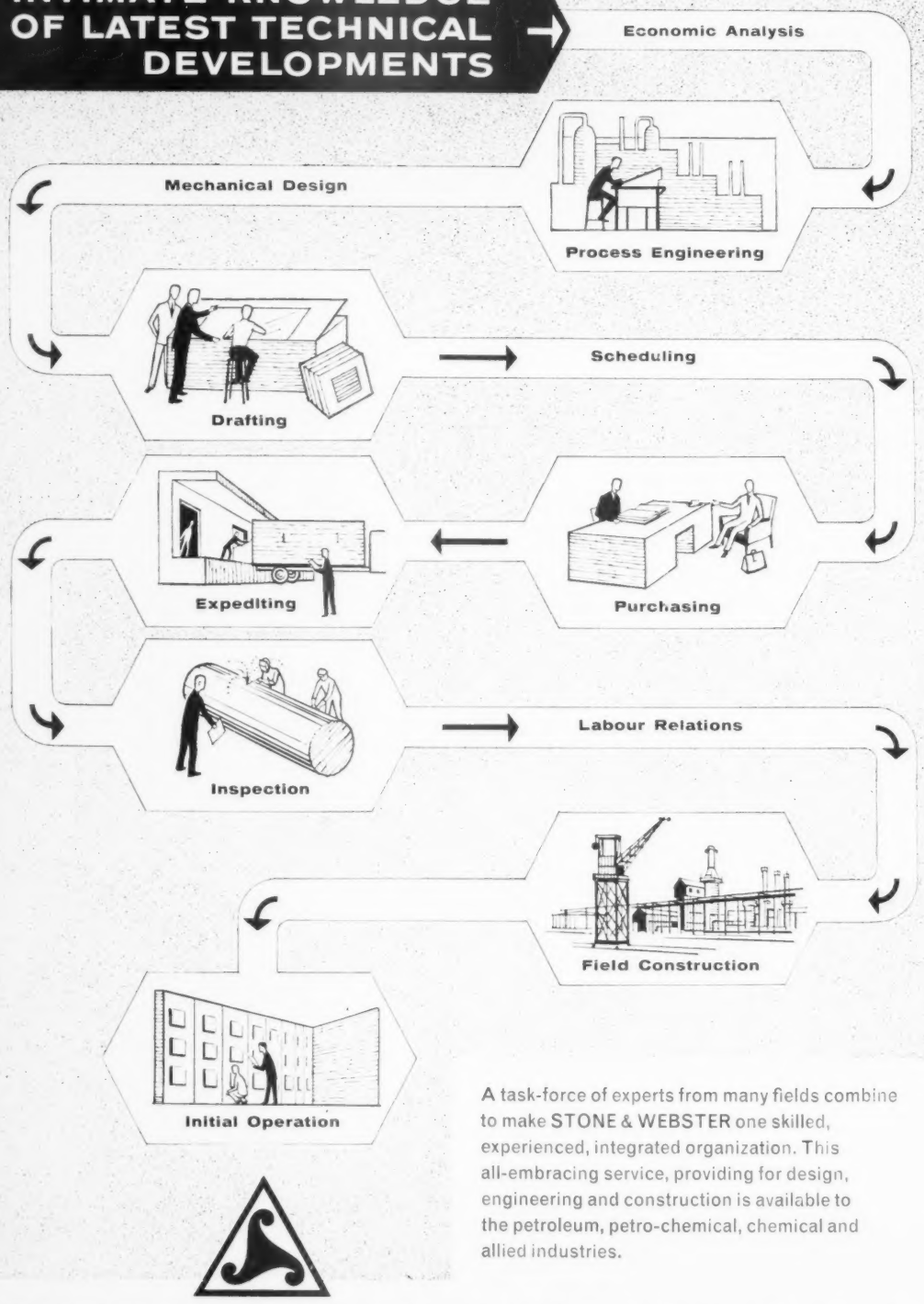

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